

# AJTES

## ALBANIAN JOURNAL OF TRAUMA AND EMERGENCY SURGERY

Focus on  
“Trauma and Emergency Surgery”  
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# 2nd Annual Albanian Congress of Trauma & Emergency Surgery

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Volume 2 - Number 1 - January 2018

# **Focus on “Trauma and Emergency Surgery” and not only...**

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ISSN 2521-8778 A

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# AJTES

Albanian Journal of Trauma and  
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Design & Layout: Genc Musa  
Printed: Barleti Publications

ISSN 2521-8778 A

Albanian Journal of Trauma and Emergency Surgery is the official publication of Albanian Society for Trauma and Emergency Surgery - ASTES

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AJTES is a periodical journal includes editorials, reviews, original articles, case reports, short report, ideas and opinions, book reviews, perspectives, seminars, symposium and mini- symposium, ethics and rights, health care policy and management, practice guides. The structure of each edition of the publication comprises section categories determined by Editor and reflects the views of the Editorial Board.

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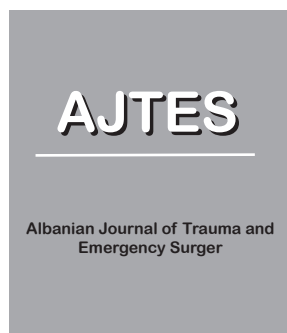
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Note from The Chairman of Editorial Board

## Great start and the albanian college of surgeons

**Rifat Latifi, MD, FACS, FICS**

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### Dear Colleagues and Friends,

In this first editorial, I want to discuss two important issues. First, it is a distinct pleasure and honor to welcome you to read the second issue of The Albanian Journal of Trauma and Emergency Surgery (AJTES), that this time is publishing the best papers presented at the 1<sup>st</sup> Annual Congress of Trauma and Emergency Surgery (ACTES) of the Albanian Society for Trauma and Emergency Surgery (ASTES), that took place in the beautiful city of Tirana, Albania.

This journal is a result of a newly created Albanian Society for Trauma and Emergency Surgery that has assembled members of all national surgical and medical societies of Albania, Kosova, and Macedonia including ASAI, ASEM, NCME, MAYA, ASOT, SMMA, ASOMFS and others, and has organized a world class international meeting with national and international speakers from many countries of the world. The objectives of this conference and the mission of ASTES were to start national and international dialog, deliberation and collaboration of all involved in caring for trauma and emergency surgery patients, as one of the most pressing and neglected healthcare issues facing the region, get to know each other better, share knowledge, and create new strategies for caring for our patients where ever they may be. The meeting was

an important one for all of us, but in particular, I believe was important for medical students, residents, fellows, young surgeons, intensivists, radiologists, internist, emergency medicine specialist and nurses will find the conference of great value. So we can conclude that the ASTES and the organizers were very successful with the congress, and the fact that we have in our hand the journal is a testament to it.

While the mere fact that you in your hand the second issue of this Journal, there is a lots of work ahead of us. The AJTES will need to continue to support and encourage submission of papers from all surgical surgical and medical disciplines from the entire Balkans and beyond.

The organizing and publishing a journal takes enormous efforts from scientific community, takes trust by all of us, and hard work. In a view of new industry of open access journals, this becomes even harder. Surgical journals, most frequently are publishers and are supported by membership organization such as ours.

The importance of this conference, that has been changed now to *The Congress of Trauma and Emergency Surgery*, above all is not only the scientific merits, but the fact that has initiated a multidisciplinary meeting of all clinical and pre-

hospital services services and providers who care for trauma and injured patients and those who are in need for an emergency surgery. In addition, the AJTES, as it continues to build an coalition of partners, will elevate not only scientific consciousness, but will spearhead the building of the organization of the scientific and political milieu and become an important voice and adviser the government in leading and influencing the training, education and wellbeing of new generation of surgeons, anesthesiologist, intensivists, emergency medicine providers, and overall substantially effect strategic developments of healthcare system.

On the personal note, I was humbled and honored to serve as Honorary President of that important event that has been in making for many years now, but even more, I am grateful to serve as Chairman of the editorial board and working with leaders of Albanian surgery.

As many of you know by now, the board of the Albanian Society for Trauma and Emergency Surgery (ASTES) (Figure 1) voted on my proposal and agreed unanimously to create our own *"The Albanian College of Surgeons"* with participation of every surgical discipline that which would represent our region in the surgical world stage with

pride, and dignity like all other nations in the world. Currently I am working on administrative paper work and will submit to the next meeting of the board. Such development will put us in the world map and will become a significant engine and catalyst that will affect the future of surgical sciences in our countries and beyond, and will help navigate the new overall healthcare services. The New Albanian College of Surgeons will become the cornerstone of the future for generations to come, just like American College of Surgeons has been doing since 1913. It is time that we too join the world of surgery in the meaningful and dignifying way. This is an opportunity that we should not miss it. We know how to do it, we know how to build it, we know how to lead it, and can and must involve all of our colleagues and build a powerful alliance that generations to come will be proud of you all. The successful organization of this meeting exemplifies all of the above perfectly. At the end I would like to congratulate the editorial board and authors on a well done issue of the AJTES, and expect that each number will get better.

January, 2018  
Valhalla, New York



Mbledhja e asamblese 2017

# Damage Control Orthopedic Surgery

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## Abstract

The concept of damage control surgery was first described for the purpose of treating medically unstable patients with abdominal trauma. The purpose of such surgery is rapid control of hemorrhage and contamination, not definitive repair of injuries. The goal is to improve survival of patients with the potentially lethal triad of hypothermia, acidosis and coagulopathy. Definitive repair of injuries and abdominal closure are not performed at the time of initial laparotomy. Rather, the abdominal wound is left open, a dressing is placed, and the patient is transported to the intensive care unit for continued resuscitation. This includes optimization of hemodynamic condition, respiratory support, warming, and correction of coagulopathy. Following successful resuscitation, when the patient is medically stable, a return to the operating room is scheduled for repair of injuries and abdominal closure.

**Keywords:** *Damage control surgery, hemorrhage, acidosis, coagulopathy, resuscitation*

## Introduction

Damage control orthopaedics (DCO) represents the application of this methodology for treating musculoskeletal injuries in patients with multiple trauma.<sup>1</sup> The goal is to provide rapid stabilization of orthopaedic injuries while avoiding prolonged surgical procedures, giving the surgical team the best opportunity at minimizing hypothermia, acidosis, and coagulopathy. Open wounds and mangled extremities are washed out and debrided as necessary and fractures are reduced and stabilized provisionally. For long bone fractures, external fixation frames are applied to provide temporary fixation. Definitive treatment is postponed until the patient is successfully resuscitated and medically stable. In this way, prolonged surgical interventions and excessive blood loss are avoided, and the patient can be transferred to the intensive care unit as quickly as possible. Damage control orthopedic surgery should minimize the systemic inflammatory response by reducing the effect of the second hit associated with prolonged orthopaedic procedures.

## Discussion

The consensus statement of the Eastern Association for Surgery of Trauma relating to the timing of long bone fracture fixation in patients with multiple trauma is instructive.<sup>1</sup> This group performed a systematic review of the literature regarding the timing of fracture fixation in different subsets of patients with multiple trauma. Specifically, the group concluded that there is no compelling evidence that early long bone stabilization either enhances or worsens outcome for patients with severe head injury or for patients with associated pulmonary trauma. Although it is suggested that early fracture fixation may reduce associated morbidity for certain patients with multiple trauma, the study stops short of recommending early fixation for all patients. Instead, the authors recommend that the timing of fracture fixation be individualized according to the patient's clinical condition. If a patient has severe pulmonary dysfunction, remains hemodynamically unstable, or has severely elevated intracranial pressures, then prolonged surgery for extremity fractures

should be delayed.<sup>1</sup>

The application of temporary external fixation for femur fractures, with planned conversion to intramedullary nailing, has been advocated for patients with multiple trauma.<sup>2,3</sup>

It is believed that external fixation allows for some of the benefits of early fracture fixation while avoiding the pitfalls associated with prolonged orthopedic procedures. Surgical time and blood loss are minimized, and the potential pulmonary morbidity associated with intramedullary nailing is postponed until the patient has had a chance to recover from the initial traumatic insult. Compared with patients undergoing early femoral nailing, patients treated with external fixation demonstrate a blunt inflammatory response as measured by serologic inflammatory markers.<sup>4</sup> Furthermore, when patients undergo staged intramedullary nailing after temporary external fixation; they demonstrate a decreased inflammatory response following the nailing procedure. For this reason, it has been suggested that a protocol including damage control orthopedic surgery may improve the outcomes for the most severely injured patients.

However, it must be recognized that the clinical significance of a decreased inflammatory response remains uncertain. There are few prospective data that show that damage control orthopedics can actually reduce the rate of ARDS, multiple organ failure, or mortality. Critics argue that damage control protocols contradict decades of experience and the accumulation of data supporting the superiority of early fracture fixation in patients with multiple trauma.<sup>5</sup> Proponents infer the success of damage control orthopedics based on studies showing that patients treated with damage control orthopedics seem to have results that are better than might have been expected based on their ISS scores.<sup>3,6,7</sup>

## Conclusions

Temporary external fixation makes sense for those patients too sick to undergo early definitive fixation of their orthopedic injuries. Although damage control protocols do make theoretic sense, prospective data are lacking. Additional



study may be required before damage control protocols are universally accepted.

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# Surgical Treatment in Bronchiectasis: Analysis of Our Patients

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## Abstract

**Background:** Bronchiectasis is usually caused by pulmonary infections and bronchial obstructions. It is still a serious problem in developing countries, as our country. We reviewed the morbidity and mortality rates and outcomes of bronchiectasis surgical treatment.

**Patients and methods:** Between years 2000 and 2016, one hundred and seven (107) patients, sixty nine (69) of whom female and thirty eight (38) male underwent pulmonary resection for bronchiectasis. The mean age was 35years (range, 13–66 years). Mean duration of symptoms was 12 years.

**Results:** Symptoms were copious amount of purulent sputum in 84 patients, expectoration of foul-smelling sputum in 72, haemoptysis in 21 and cough in all patients. The indications for pulmonary resection were: medical therapy failure in eighty two (82) patients, massive haemoptysis in eighteen (18) and lung abscess in seven (7) patients. The disease was bilateral in twenty seven (27) patients and mainly confined in the lower lobe. Eighty six (86) patients had a lobectomy, 7 had a segmentectomy, two patients right pneumonectomy. Operative morbidity was seen in 47 patients (43.9 %) and mortality in two (2) patients. Follow-up was complete in 97 patients with a mean of 5 years. Overall, 78 patients were asymptomatic after surgical treatment; symptoms were improved in 24, and unchanged or worse in 5.

**Conclusions:** Surgical treatment of bronchiectasis is more effective in patient with localized disease. It is satisfactory with acceptable ratio of morbidity and mortality.

**Keywords:** Bronchiectasis, surgical treatment, haemoptysis

## Introduction

Bronchiectasis, a chronic necrotizing infection of the bronchi and bronchioles leading or associated with abnormal dilation of these airways, was first described by Laennec in 1819 [1, 2]. Today, with the improvement of health care and the availability of suitable antibiotics, the prevalence of bronchiectasis has declined and the patients with early disease can be treated successfully by conservative procedures in developed countries. Bronchiectasis still constitutes an important problem in developing countries, mainly due to infections such as tuberculosis, pneumonia, pertussis and serious rubeola infections [3–5]. Few recent reports of surgical management of bronchiectasis are available in English literature.

**Objective:** We present here our 15-year experience on 86 patients with bronchiectasis who underwent surgical treatment.

**Patients and methods:** Between 2000 and 2016, 107 patients with bronchiectasis were operated on in the Department of Thoracic Surgery in University Hospital “Shefqet Ndroqi”. All patients were evaluated with a detailed history and physical examination and blood tests including a complete blood count and biochemical analysis.. Pulmonary function tests were performed routinely. Quantitative pulmonary ventilation and perfusion scans were carried out in patients with poor pulmonary function. Radiologic examinations included chest radiography, and a thorax computed tomography (CT).

Treatment of severe exacerbations of Bronchiectasis to hospital and their treatment is usually done by Pulmonologist and surgery is reserved for patients with focal disease and poorly controlled with conservative treatment, after a team consult ,both pulmonologist, thoracic surgeons and radiologists. All patients had intensive chest physiotherapy in preoperative period. Sputum culture and sensitivity tests of all patients were examined and received prophylactic antibiotics. Chest physiotherapy was continued until the daily volume of the sputum decreased to 50 ml or less. Flexible bronchoscopy was also performed for all patients for the removal of secretion and determining foreign body or endobronchial lesions. During surgi-

cal procedure, a double-lumen endotracheal tube was used to provide isolated ventilation to each lung to prevent spilling of secretion to the other side. Poster lateral thoracotomy was performed in all patients. If the disease is limited to one lobe, lobectomy was done and when the whole lung was affected, pneumonectomy was performed. When patients had poor respiratory functions tests or disease is fairly limited, segmentectomy was performed.

During pulmonary resection, excessive bronchial dissection was avoided, and peribronchial tissues were preserved. Toilet-bronchoscopy was performed routinely preoperatively, after intubation. All resection specimens were subjected to histopathologic examination in order to confirm the diagnosis. Postoperative management included intensive chest physiotherapy and administration of antibiotics and analgesics.

Operative mortality included patients who died within 30 days after thoracotomy or those who died later but during the same hospitalization. Follow-up information was obtained for all survivors, either by periodic clinical evaluation or by telephone call with the patients or his/her relatives.

The patients were followed up for a mean period of 5 years, ranging from 6 months to 15 years. Segmentectomy was accepted as an incomplete resection. At last follow up, the outcome of surgery was evaluated according to the following criteria: (1) excellent-complete absence of preoperative symptoms leading to surgery; (2) good-marked reduction in preoperative symptoms; and (3) no-change no-reduction in preoperative symptoms.

The patients were evaluated according to gender, age, symptoms, clinical and radiographic findings, the method of treatment, and prognosis. Data are expressed as mean  $\pm$  standard deviation and differences were considered statistically significant when the P value was less than 0.05.

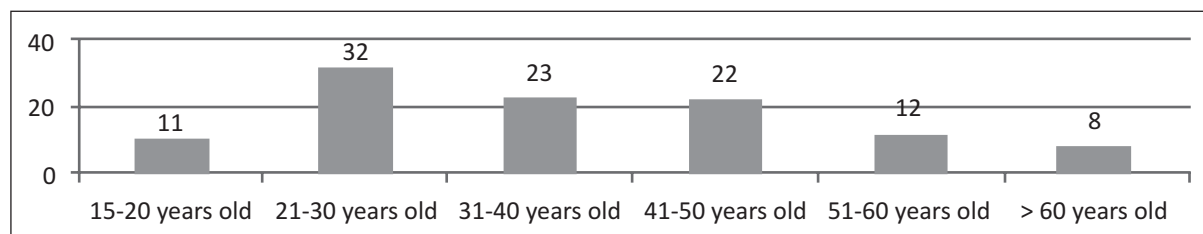
## Results

The mean ages results  $37 \pm 18.8$  years (ranging from 13 to 69 years). Female patients 69 (64.5%) were greater than male patients 38 (35.5%) in number, but without statistically significance



( $p=0.084$ ). More than  $\frac{1}{2}$  of patients 66 (61.8%) were between 21 to 40 years-old (Table. 1). Symptoms were copious amount of purulent sputum in 84 (78.5%) patients, expectoration of foul-smelling sputum in 72 (67.2%), haemoptysis in

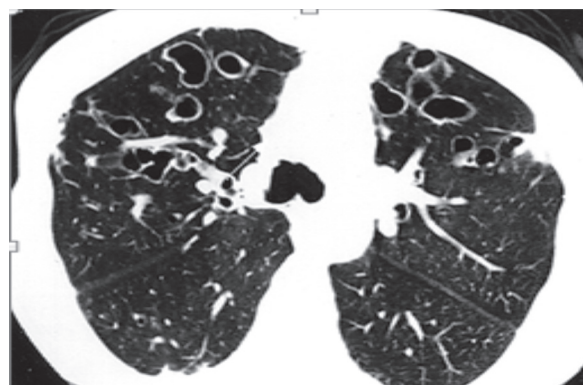
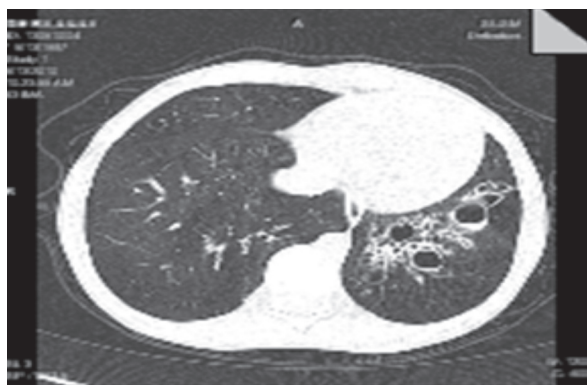
18 (16.8%) and cough in all patients. Mean time of complaining was 6 years (range 4 to 12 years). Nearly all patients had recurrent pulmonary infection.



**Table 1: Age distribution of patients.**

Chest CT scan was performed in 84 patients. The major findings were: Cystic or saccular bronchial dilation (Fig. 1), in approximately 68 % of patients,

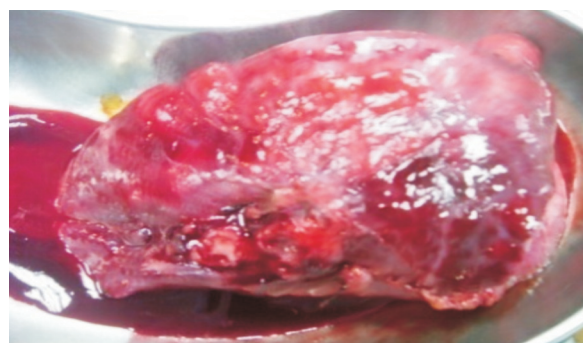
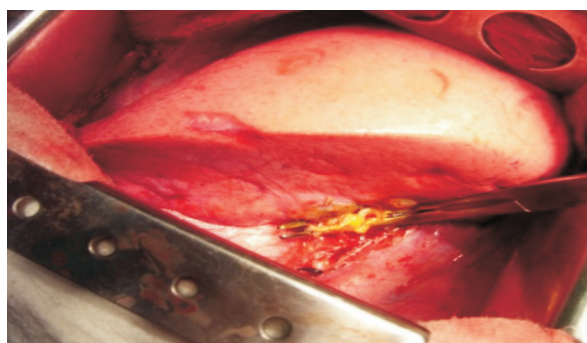
lobar retraction was noted with CT scan (Fig. 1 B). Bronchography was performed in two patients in other clinics.



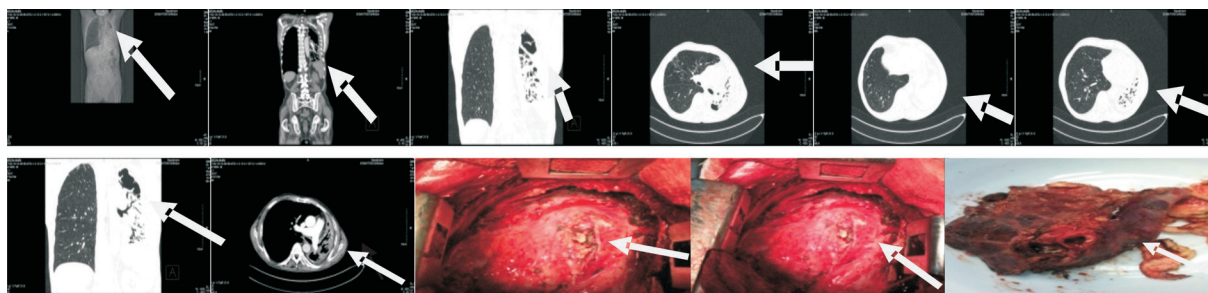
**Figure 1: CT scan image: A) a cystic bronchiectasis in the left lower lobe BA) cystic bronchiectasis in anterior distribution in both tow lungs;**

The most common microorganisms found in sputum cultures were: Haemophilus influenza (15.8%), Pseudomonas aeruginosa (8.4%) and Streptococcus pneumonia (7.4%). In preoperative bronchoscopic examination, neither a foreign body nor an endobronchial lesion was detected.

The indications for pulmonary resection were: poorly controlled symptoms with conservative therapy in 83 (77.5%) patients, massive haemoptysis in 18 (16.8%) and lung abscess in 6 six (5.7%). Posterolateral thoracotomies were performed in all patients.

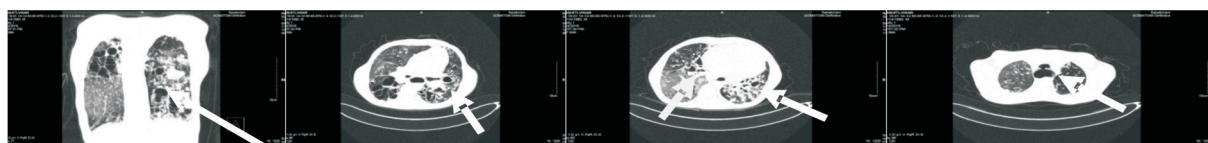


**Fig. 2: A) momment during surgery procedure, B) Gross figure of lung bronchiectasy**



**Fig.3 CT Bronchoectasi Saciforme Cistine, Pulmon sinister et finrothorax sinister.**

Pleurepneumonectomi sinister.



**Fig.4: Bilateral lung saciforme bronchoectasia et tracheoesophageal fistulae.**

According to operative findings, right lower lobe 64 (59.8%) was the most common localization. 86 (80.4 %) had a lobectomy, 2 (1.9%) had a pneumonectomy, 7(6.5%) had a segmentectomy and

combined lobectomy and segmentectomy in 1 (1.5%). Lobectomy was the most preferred surgical method (Table 2).

	<i>Right lung pat. Nr. (%)</i>	<i>Left lung pat. Nr. (%)</i>	<i>p-value</i>	<i>Total pat. Nr. (%)</i>
<b>Pneumonectomy</b>	2 (3.1%)	2 (4.6%)	-	2 (1.9%)
<b>Lobectomy</b>	55 (85.9%)*	29 (67.4%)*	P=1.00	86 (80.4%)
<b>Lobectomy+ segmentectomy</b>	1 (1.5%)	1 92.3%)		2 (1.9%)
<b>Segmentectomy</b>	5 (7.8%)*	2 (4.6%)*	P= 0.751	7 (6.5%)
<b>Total</b>	64 (100%)	43 (100%)		107 (100%)

**Table 2: Surgical procedures: \* p =1.0; p =0.751 (no significant difference)**

Operative morbidity was seen in 47 (43.9%) patients with 11 (11.2 %) major and 36 (33.6%) minor complications (Table 3). Re-thoracotomy and open window was performed in 2 patients for postoperative empyema. Nasotracheal aspi-

rations and flexible bronchoscopy were used in four patients with atelectasis for the removal of secretion. Operative mortality was seen in two patients. The causes of death were pulmonary embolism and myocardial infarct.

<i>Complications</i>	<i>Total Pat. Nr. (%)</i>
<b>Postoperative bleeding</b>	7 (6.5%)
<b>Bronchopleural fistula</b>	4 (3.7%)
<b>Empyema</b>	4 (3.7%)
<b>Pulmonary embolism and myocardial infarct</b>	2 (1.9%)
<b>Pleural fistula</b>	5 (4.8%)
<b>Prolonged air leak</b>	3 (3.4%)
<b>Wound infection</b>	10 (9.4%)
<b>Atelectasis</b>	8 (7.4%)
<b>Total</b>	47 (43.9%)

**Table 3: Complications following surgery bronchiectasis**

Follow-up was complete in 98 patients with a mean of 5 years (range 6 months–15 years). Seventy eight patients were asymptomatic after surgical treatment; symptoms were improved in 24

patients, and unchanged or worse in five cases. The results of complete resection were better than those of incomplete resection, with significant difference (Table 4).

<i>Outcome</i>	<i>Complete resection pat. Nr. (%)</i>	<i>Incomplete resection pat. Nr. (%)</i>	<i>p-value</i>
<b>Excellent</b>	78 (85%)	- (0 %)	-
<b>Good</b>	16 (11.2%)*	8 (80.0%)*	P = 0.0018
<b>No change or worse</b>	3 (3.4%) **	2 (20.0%) **	p = 0.0084
<b>Total</b>	97 (100%)	10 (100%)	

**Table 4: Results of complete and incomplete resections. \*, \*\* significant difference**

## Discussion

The incidence of bronchiectasis is unknown [3]. Bronchiectasis is usually caused by pulmonary infections or bronchial obstruction. Bronchiectasis is still a problem in developing countries as our country [3, 4]. In spite of the advances in thoracic surgery, the optimal treatment for bronchiectasis remains controversial.

Recurrent pulmonary infection of childhood is an important factor in the etiology. Similar to the other series, most of our patients have recurrent infections in their histories [3, 5, and 6]. This situation is significant because of emphasizing the importance of the adequate and favorable treatment of pulmonary infections of childhood.

The diagnosis of bronchiectasis today is not a problem. Before the usage of CT scan, bronchography was the standard procedure for diagnosis [7, 8]. However, in bronchography, timing of the study is important. Only one lung is studied at a time, and the study should be done when the patient is in optimal condition, after postural drainage, and antibiotics have controlled any acute exacerbation and secretions are decreased to a minimum [1]. However, these conditions are not required for CT scan. The detailed images demonstrate bronchial dilatation, peribronchial inflammation and parenchymal disease [7, 8, and 9]. The preoperative diagnosis based on CT scan findings was consistent with operative findings in all our cases. Some authors recommended bronchography as a reliable method for the diagnosis of bronchiectasis [4, 5]. After the routinely usage

of CT, we did not use bronchography and do not recommend it for the diagnosis of bronchiectasis. The use of bronchography has been decreasing and has been progressively replaced by CT scan as in our series [9, 10]. In our study only in two patients performed it in other clinics. According to our experience, preoperative CT findings and operative evaluation are sufficient to make a decision for complete resection in bronchiectasis.

The treatment of bronchiectasis includes: controlling of bronchial secretions and infections, prevent further damage and infections and reduce symptoms. Surgical therapy should be considered: in poorly controlled disease (focal disease poorly controlled by antibiotics), in massive haemoptysis, foreign body or tumor removal [1, 11]. Almost all patients with bronchiectasis have been followed by chest physicians, being on medical treatment for many years. The most common symptoms were chronic cough, expectoration of foul-smelling, purulent sputum. Sometimes the daily volume of the sputum could be raised up to 250–500 ml. Consequently, patients suffer from social deprivation and intrinsic depression. According to our clinical experience, patient with bronchiectasis is often introverted. The use of antibiotics in almost every recurrence of pulmonary infections increases the costs of treatment and frequently causes side effects related with these drugs. Hospitalization during pulmonary infections also causes loss of work ability. After every acute infection, surrounding normal pulmonary tissues are also affected and bronchiectatic areas

get larger and lead to destroyed lung.

Moreover the surgical treatment of bronchiectasis is satisfactory with acceptable operative mortality and morbidity rates of 1–8.6 and 14–53% previously reported, respectively [3–6, 11]. These rates were 2.3 and 38.3% in our series.

In bronchiectasis, unilateral, segmental or lobar distribution, persistent, recurrent symptoms when medication is discontinued, recurrent infection and hemoptysis is each an indication for surgical treatment [3–5, 11]. The goals of surgical treatment are complete resection and to ensure the quality life. For successful surgery: (1) we recommend that the operation should be performed in 'dry period'. (2) In intraoperative examination, if suspected areas that could not be determined by radiological examination are present, these parenchymal areas should be resected to perform complete resection and to decrease relapse rates. (3) Surgical treatment of bronchiectasis should be done in childhood because the residual lung could still grow to fill the space left in the chest after resection.

Most of our patients have limited disease, and

complete resection was possible in 90% (n=97). Bilateral bronchiectasis does not present a contraindication to surgical therapy in selected patients [1, 4, and 5]. In our series, 27 patients (25.2%) had bilateral bronchiectasis. Results of these cases were similar to those of other reports [1, 5, and 11]. Complete resection of the lesion is important in these patients. In our series, patients with complete resection had better prognosis than those with incomplete resection. More than 90% of our patients had total relief or substantial improvement in their preoperative symptoms. These results are similar to other series [1, 5, and 11].

## Conclusion

Surgical treatment for bronchiectasis should be limited when localized disease and life-threatening symptoms are present. For a successful result, complete resection should be performed. In patients with bronchiectasis, pulmonary resection can be performed with acceptable morbidity and mortality rates.

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# Management of Explosions and Blast Injuries after Gërdec Tragedy, Albania

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## Abstract

**Background:** In the last decade, the risk of terrorist attacks has increased largely almost worldwide. In this setting, disaster response personnel must understand the unique physiopathology of injuries associated with explosions and must be prepared to assess and treat the people injured in such tragedies. The ammunition explosion in Gërdec, Vora, just 13 miles from the capital of Albania, Tirana, confronted our country with a real human tragedy with severe casualties. The striking force of the two consecutive explosions resulted in two consecutive earthquakes with respectively an amplitude of 9.2 and 2.5 on the Richter scale.

**Objective:** To explain the classification of explosives and in connection with it to identify the major types of explosive and blast injuries, and the management options in the cases of explosions and blast injuries.

**Material & Methods:** Efforts to dismantle Albania's stockpiles of obsolete munitions took a catastrophic turn on March 15<sup>th</sup>, when a series of explosions occurred as crews were clearing out a storage depot in Gërdec, on 15<sup>th</sup> of March 2008, at 12:15 AM hours. Gërdec is located 10 km northwest of the capital of Albania, Tirana; near the national highway Tirana-Durres and at a distance of 3-4 km in air line from National Airport. Data presented here were collected from the patients' files in our Trauma UHC and from the official reports from the different governmental offices.

**Conclusion:** The explosive and blast injuries now present a true modern epidemic disease that threaten the very survival of the free world. A thorough understanding of detonation and blast dynamics by the treating teams is required to better correlate the injury patterns presented. This is also critical for revision of current multiple casualty protocols. It is up to the medical establishment to prepare suitable protocols, coordinate manpower and secure medical resources to successfully handle such events.

**Keywords:** BLI (Blast Lung Injury); CT (Computerized Tomography); DPL (Diagnostic Peritoneal Lavage); FAST (focused abdominal ultrasound); IED (Improvised Explosive Device)

## Introduction

Blast injuries result from explosions that have the capability to cause multisystem, life-threatening injuries in single or multiple victims simultaneously. These types of events may constitute a rather complex triage, and a real diagnostic and management challenge for the health care providers.

Blast injuries are generally categorized from primary to quaternary injuries.[1,2,3] Primary injuries are caused by the effect of transmitted blast waves on gas-containing structures; secondary injuries are due to the impact of airborne debris; while tertiary injuries are caused by the transposition of the entire body due to the blast wind or structural collapse; and quaternary injuries constitute injuries inflicted by all other forces. A patient may be injured by more than one of these mechanisms.[1,2,3] As the risk of terrorist attacks increases in the world, disaster response personnel must understand the unique physiopathology of injuries associated with explosions and must be prepared to assess and treat the people injured in such occasions.

A major impact factor to the scale of injury is the proximity of the person to the explosion in a primary blast injury. [3] For example, a person in a 3m (10ft) distance from the explosion experiences 9 times more overpressure than a person situated 6 m (20ft) away (double the distance) at the moment of the event. In addition, other factors are to be taken in consideration. Blast waves are reflected by solid surfaces; thus, a person standing next to a wall may suffer increased primary blast injury. [3]

The explosions at the army depot in Gërdec village, around 10km north of the capital of Albania, Tirana, were overheard in a distance more than 50 km (30 miles) away. Albanian newspapers described the blast as “Albania’s Hiroshima” and an “Apocalyptic tragedy”.

Efforts to dismantle Albania’s stockpiles of obsolete munitions took a catastrophic turn on March 15<sup>th</sup>, when a series of explosions occurred as crews were clearing out a storage depot in the outskirts of Tirana. The explosions lasted nearly 14 hours, and resulted in 26 deaths and more than 300 injured, while thousands of people were left home-

less, resulting in a total economic damage of 16.6 mil Euro worth, including the catastrophic damage to hundreds of homes and other civilian structures within a 2.5 kilometers (1 1/2 miles) radius from the dismantling facility. Several officials of the Ministry of Defense and managers and directors of the private company disposing of the ammunition were arrested on charges of negligence. About 100,000 tons of excess ammunition, mostly Russian and Chinese artillery shells produced in the ‘60s or earlier, are stored in former army depots across Albania. The country pledged to dispose of the ammunition by 2010, with assistance from the US, Canada and other NATO countries. It appeared that most of the injured were caught by the blast, which was traced up to 200 kilometers away in the Macedonian capital of Skopje and which was also registered as an earthquake by the seismographs as far as in Strasbourg. The initial explosion was followed by a series of blasts, and ammunition continued to detonate for hours. Attempts to fly rescuers into the area by helicopters were thwarted by the continuing explosions, and armored vehicles were used to ferry rescue units into the area. Injured people were taken to nearby hospitals. Local media reported the injuries included burns, concussions, broken limbs, and cuts from flying glass and shrapnel.

Ammunition explosion in *Gërdec, Vora, just 13 miles* from the capital city of Albania, resulted in large numbers of severe casualties in the country. The striking force caused by to consecutive blasts, resulted in two consecutive earthquakes with an amplitude of respectively 9.2 and 2.5 on the Richter scale.

Explosion of collected munitions occurred on 15th of March, 2008, at 12:15 AM, in an extermination facility located in Gërdec, close to Tirana-Durres national highway, northwest of Tirana, and at an air-line distance of 3-4 km from National Airport.

*Within a timespan of thirty minutes, this explosion constituted the greatest tragedy that ever happened in my country.* According to the Defense Ministry and witnesses who worked in the department, most of the ammunition comprised high caliber shells and the gunpowder used for their weapons, which were being removed and

separated.

The economic impact was calculated as *36.7 million euro*, with some *3390 buildings* damaged by the blast, including homes, local businesses and factories. So, *407 houses* were completely destroyed and *250 different businesses* were damaged after the blast. Most of these businesses were located in immediate proximity to Gërdec village, along the Tirana-Durres highway. [3]

A *medical facility* suffered blast damage from warehouses in Gërdec. The only health center established in this area was damaged, in addition to *eight schools*. According to the assessment team, the schools were not completely destroyed. *5000 of the shells* collected in an area of 900–hectares resulted as harmless by the expert military inspection while *690 collected shells* were considered dangerous. Damages were also registered in another *1112 buildings* in the surrounding areas of Gërdec.

*In a few minutes the blast* made a huge hit on the health of the people involved directly or indirectly in the region. *It required* the primary rescue of damaged lives and wounded people, provision of first aid, stabilization and final treatment. First aid for the injured was performed instantly by ordinary nearby citizens. Within a few minutes the police intervened and were immediately followed by special army units that were nearby.

The Ministry of Health carried out rescue operations in all the areas affected by the tragedy of Gërdec.

*Twelve helicopters from the Medical Transport Unit* contributed to the tragedy in Gërdec. This is the total number of medical helicopters owned by the center at the time, which was directly under the Ministry of Health in dependency level, while *thirty ambulances* on the disaster area were put into service to transport the injured from Gërdec, from which thirteen were provided by the Ministry of Defense and the rest by the Ministry of Health and the Ministry of Interior Affairs.

*A thousand* was the number of military forces engaged on mission in Gërdec. All units, such as civil emergencies, units of Engineer troupes and special teams were involved in the operation to save as many lives as possible and to demine the area.

*Fifty doctors from the Military Hospital* were called in and were available for the entire day to provide both first aid and specialized treatment to all the injured. With the special order of the Ministry of Health *fifty doctors and two hundred nurses* worked at the Military Hospital without stop throughout the day of the event, while special shifts were organized for the following days.

After the event, the government ordered the establishment of three emergency staff offices:

*The first* was established in Vora, Tirana, right by the scene. *The second* was established in the operating units in the Central Military University Hospital Center (CMUHC). *The third* was established at “Mother Theresa” UHC, in Tirana and in the regional hospital in Durres, with the goal to give first aid, help in *stabilizing the patients and provide final treatment to them*.

In addition, a *health center* was established Near the Explosion Field through the health personnel of the area, mainly responsible for the evacuation of the injured, etc.

*The total count was 300 injured* by the event. This country has actually testified a large number of children injured from limited weapon depot explosion previous to this event.

*Twenty one resulted dead* from the tragedy of Gërdec. Corpses found at the scene reduced the number of missing, thus raising and confirming the number of deaths. *Four were reported missing* from the explosion of weapons warehouses in Gërdec. All four were employees of the ammunition dismantling facility. Mortality rates in other similar accidental or terroristic explosions vary widely between incidents. An analysis of 29 large terrorist bombing events between 1966 and 2002 showed 8,364 casualties, including 903 immediate deaths and 7,461 immediately surviving injured. [4]

## Methods and Materials

A thorough review of all the patients' files hospitalized from the event was performed and the data was then calculated and are presented below in correlation with the age-groups, gender and type of injury, etc. in both absolute and percentage value.

## Results

The data have been presented in both absolute value and percentage value.

The distribution of trauma cases *by gender* was as follows: 89 (51%) females and 87 (49%) males.

The distribution *based on the age* was: a) 0–14 years old — 27 (15%); b) 14–30 years old — 44 (25%); c) > 30 years old — 105 (60%) of cases.

When we compare our data with the literature data we find similarities and differences. In a study of firework-related injuries treated in EDs in the United States from 2000 to 2010, the higher rates were noted in children, with the highest rates being observed in 10–19 year olds (7.28 per 100,000 persons) and 0–9 year olds (5.45 per 100,000 persons). The injury rate was nearly 3 times higher for males than for females (4.48 vs. 1.57 per 100,000 persons). [6, 7]

In relation to the type of injuries, the patients with *superficial VLC* constituted 75 (41.9%) of the injured; patients with different fractures constituted 20 (11.3%) of the overall cases; while 43 patients (24%) were diagnosed with *body & head* damages and 24 (13.4%) with tympanic membrane perforation (TMP), while 13 (7%) were diagnosed with combustion in the different stages. 66 (37%) of the overall trauma patients were hospitalized for prolonged treatment, and 11 (16%) were transferred in medical centers abroad.

The most common injuries were burns (26.7%) of the wrist, hand, and finger, followed by contusion or superficial injuries to the eye (10.3%); while open wounds of the wrist, hand, and finger were third in row (6.5%). [6, 7]

From a literature review, unique patterns of injury are found in all bombing types. Injury is caused both by the direct blast overpressure (primary

blast injury) and by a variety of associated factors. Enclosed-space explosions, including those occurring in buses, and in-water explosions produce more primary blast injury. Blasts in ultra-confined spaces such as buses have the highest associated mortality. [5]

In a study of the relationship between tympanic membrane perforation (TMP) and severity of blast injury, TMP was more prevalent in patients with moderate and severe injuries than in mildly injured patients (53.3% vs. 13.6%). Patients with TMP more often needed surgery, ICU hospitalization, and transfer to a level I trauma center. [9]

Similarly, in a review of 167 patients who underwent blast exposure in Iraq, TM perforation was noted to be poorly sensitive as a biomarker for more serious primary blast injury. [8]

A health center was established Near Field Blast through the area health personnel helping in evacuation.

Military Medical Research Institute, in collaboration with the Institute of Public Health (IPH), made available doses of 600 ATV and enabled the application in the field hospital facilities contingents, which directly took part in search-rescue and in the clean-up of the area.

*Destruction of dead animals:* An important element, which, constitutes a danger to the troops and the population—is the finding and disposing of dead animals. In a short period, 233 dead animals were found, disinfected and buried (19 cattle, four fowl, three pigs, four perissodactyls and 203 birds).

*Blood donation:* The blood need was covered by a great influx of solidarity and voluntary donors from all Albanian territories.

No.	Data	Age Groups (in years)			Gender		TOTAL	%
		0-14	14-30	>30	M	F		
1	<b>TOTAL CASES</b>	<b>27</b>	<b>44</b>	<b>105</b>	<b>87</b>	<b>89</b>	<b>176</b>	<b>100</b>
2	<i>Superficial V.L.C.</i>						75	41.9
3	<i>TMP</i>						24	13.4
4	<i>Extremity fractures</i>						20	11.3
5	<i>Commotions &amp; Contusions of the Head</i>						43	24.4
6	<i>Extremities Amputation</i>	1				1	1	0.5
7	<i>Combustion of different grades</i>						13	7.3
8	<b>TOTAL (2+7)</b>						<b>176</b>	<b>100</b>
9	<b>HOSPITALIZED</b>						<b>66</b>	<b>100</b>
10	<b>TRANSFERRED ABROAD</b>	GREECE					6	9
		ITALY					4	6
		TURKEY					1	1
		<b>TOTAL</b>					<b>11</b>	<b>16.6</b>

VLC – *Vulnus Lacero Contusum*; TMP - *tympanic membrane perforation*

**Table 1: Distribution of data per injured patient.**

## Conclusion

Explosive and blast injuries represent a true modern epidemic that threaten the very survival of the free world. A thorough understanding of detonation and blast dynamics by the treating teams is required to better correlate the injury patterns presented. Such an understanding and

these experiences are also critical for revision of current multiple casualty protocols. It is up to the medical establishment to prepare suitable protocols, coordinate manpower and secure medical resources, which are key to successfully handle such events.

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# Predictive Factors and the Role of Traumatic Brain Injury in Stroke

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## Abstract

**Background:** Traumatic brain injury (TBI) is the leading cause of mortality and invalidity worldwide.

**Objective:** To explore whether traumatic brain injury may be a risk factor for subsequent stroke and to evaluate the role of other risk factors correlated with TBI and stroke.

**Methods:** We analysed 643 patients presented in the emergency department of Trauma UHC, from 1<sup>st</sup> of June 2011 - 1<sup>st</sup> of December 2011. We evaluated the following factors: age, gender, and severity of head trauma, type of head trauma, systemic hypertension, atrial fibrillation, and diabetes mellitus.

**Results:** During 1-year of follow up period 32 (4.97%) strokes occurred in TBI patients. The evaluation was done in correlation with the other risk factors taken into account in the study.

**Conclusions:** The role of TBI is underestimated in the evaluation of stroke. This study demonstrated that during the first year after TBI, 13.53 % of patients experienced stroke. After careful statistical correlations with the selected co-morbidities, we found that the diagnosis of stroke was strongly related with TBI.

**Key words:** *Stroke, traumatic brain injury, risk factors*



## Background

Traumatic brain injuries (TBIs) are the leading cause of mortality and invalidity in developing and non-developing countries. The incidence rates of TBI have been reported as 234, 532, 322 per 100.000 respectively in Europe, America and Australia. (1, 2, 3)

Rates of TBIs are highest in the very young population (age group zero to four years old), in adolescents, and in young adults (15-24 years old). There is another peak of incidence in the elderly (age  $\geq$  65 years old). As with most traumatic injuries, the incidence of TBI is significant higher in men compared to women with a ratio that has been reported to vary between 2.0 to 1 and 2.8 to 1. (4-6)

People who have had a traumatic brain injury may have an increased risk of stroke. Controversy data support the role of traumatic brain injury in stroke. Any damage to the brain causes impairment to the vascular system, which supplies blood and nutrients to the cells of the brain. A stroke resulting from disturbance in the blood supply to the brain is a cerebrovascular event involving loss of brain functions. It is thus rational to speculate that cerebrovascular damage in the head caused by TBI may be a trigger for stroke. (7)

## Objective

To evaluate the role of traumatic brain injury and other predictive factors in stroke.

## Methods

This study used data of patients presented in the Emergency Department (ED) of Trauma UHC of Tirana from 1<sup>st</sup> of June to 1<sup>st</sup> of December 2011. A total number of 643 patients were presented in the ED. A prospective cohort study was done and the patients were evaluated in 3, 6 and 12 months. Maximum likelihood estimates odds ratios (OR) and confidence intervals (CI) 95% were computed using both conditional and— to minimize the problem of missing data—unconditional logistic regression. Unconditional logistic regression correlates with the variables included age and gender.

## Results

Out of a total of 643 patients presented in the ED with the diagnosis of traumatic brain injury, 167 (25.98%) were females and 476 (74.02%) were males. After matching for age and gender, the patients with TBI and stroke were more likely to have hypertension ( $P < 0.01$ ), diabetes ( $P < 0.01$ ), atrial fibrillation ( $P < 0.01$ ).

Out of 643 patients, 32 (4.97%) patients had a stroke event within the 1<sup>st</sup> year after the traumatic brain injury, 104 patients suffered from hypertension, 36 from atrial fibrillation and 43 from diabetes.

Gender	male	female
	476 (74.02)	167(25.98)
Stroke	24 (10.73)	8(2.79)

**Table1. Percentage of stroke in males and females 1-year post traumatic brain injury.**

We summarized the distribution of the types of traumatic brain injury and stroke in table 2.

Out of 324 (50.38%) patients with mild traumatic brain injury (13-15 points GCS), 6 (1.85 %) of them had stroke during the first year following-

head trauma; out of 222 (34.52%) patients with moderate traumatic brain injury (9-12 points GCS), 16 (7.20%) of them had stroke, while out of 97(15.08%) with severe traumatic brain injury, 10 (10.30) of them had stroke.

	MTBI	MoTBI	STBI
GCS	324(50.38)	222(34.52)	97(15.08)
Stroke	6(1.85)	16(7.20)	10(10.30)

**Table2. Percentage of patients secondary to the grade of severity of traumatic brain injury.**

We summarized the distribution of stroke, hypertension, atrial fibrillation and diabetes mellitus secondary to the patients' age group in table 3. We estimated that the highest number of pa-

tients who had stroke were in the 50-80 years old age group. In this age group, we see that the number of patients with risk factors for stroke is higher.

Age group	No. of pts	Stroke	Hypertension	AF	DM
0-9	58(9.02)	0	0	0	0
10-19	72(11.19)	0	0	0	0
20-29	116(18.04)	0	0	0	0
30-39	83(12.90)	0	0	0	0
40-49	100(15.55)	3(0.46)	18(2.79)	3(0.46)	2(0.31)
50-59	72(11.19)	8(1.24)	25(3.88)	6(0.93)	8(1.24)
60-69	69(10.73)	9(1.39)	22(3.42)	5(0.77)	18(2.79)
70-79	57(8.86)	10(1.55)	32(4.97)	12(1.86)	10(1.55)
80-90	16(2.48)	2(0.31)	7(1.08)	10(1.55)	5(0.77)
Total	643	32(4.97)	104(16.17)	36(5.59)	43(6.68)

**Table 3. Percentage and correlation of stroke and other risk factors: systemic hypertension, atrial fibrillation (AF) and diabetes mellitus (DM).**

## Discussion

This study demonstrated that traumatic brain injury is a risk factor for stroke. During the first year after TBI, 32 (4.97%) of patients were experienced stroke.

## Conclusions

The risk of stroke increased from TBI and from other comorbidities, such as systemic hypertension, atrial fibrillation, diabetes, these justify the high percentage of stroke after TBI.

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# Gender Related Differences in Reported Respiratory Symptoms

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## Abstract

**Background:** Physiological research on dyspnea has provided some information on how sex differences in lung and airway size can influence the experience of dyspnea during exercise; however, there is still a knowledge gap with regard to sex-related differences in other respiratory symptoms, including cough and sputum production.

**Objective:** The objective of this analysis was to assess sex related differences in reported objective symptoms using data from the population-based Burden of Obstructive Lung Disease (BOLD) study in Albania.

**Method:** Males and females with impaired lung function may experience the same symptoms but perceive and/or report them differently. In this analysis were included 997 responders who had completed the core questionnaire, which included data on respiratory symptoms using the following questions: "Do you usually cough when you don't have a cold?" and "Do you usually bring up phlegm from your chest, or do you usually have phlegm in your chest that is difficult to bring up when you don't have a cold. Chronic was defined as three months or more per year. Data used were drawn from the final report for Albania provided by BOLD team.

**Results:** Overall, male gender was associated with increased odds for reported chronic cough at any group age [Total: 14.7 (2.3) vs. 6.6 (0.9)]. This difference is very much reduced in the group age 70+ years old [25.8 (8.2) vs. 21.3 (6.8)]. In the contrary when we used the estimated population prevalence of chronic cough by pack-years and gender, female gender was associated with increased odds for reported chronic cough especially in the 10+ pack-years groups [50.4 (11.0) vs. 12.2 (8.3) in 10-20 pack-years and 29.0 (5.5) vs. 26.0 (3.3) 20+ pack-years] indicating a increased smoking susceptibility of female gender. In contrast, female gender was associated with decreased odds for reported phlegm. Even for the same pack-years of smoking, female gender is associated with decreased odds for reported chronic phlegm [0 vs. 7.1 (8.6) in 10-20 pack-years group; 0 vs. 15.4 (3.0) in 20+ pack-years group].

**Conclusions:** Physicians need to recognize that although a female may not report chronic sputum or phlegm production and a male may not report chronic cough, a diagnosis of Chronic Obstructive Pulmonary Disease should still be considered as symptoms often are the first step to a diagnosis of underlying airway disease.

**Key words:** Respiratory symptoms, gender, differences, chronic cough, COPD.

## Introduction

COPD is the fourth leading cause of death globally. It is a preventable and treatable disease, characterized by persistent airflow limitation and impaired lung function. The diagnostic algorithm of chronic bronchitis, emphysema or COPD begins with reporting respiratory symptoms to the physician. It remains a major public health problem. Individuals with COPD have recurring acute exacerbations, frequent hospital admissions, poor survival, significant depressive symptoms as well as physical symptoms of cough sputum production, and shortness of breath, and impaired physical functioning and quality of life. Physiological research on dyspnea has provided some information on how sex differences in lung and airway size can influence the experience of dyspnea during exercise; however, there is still a knowledge gap with regard to sex-related differences in other respiratory symptoms, including cough and sputum production. The objective of this analysis was to address if there is any difference with regard to respiratory symptoms in males and females with normal and impaired lung function using data from the national population-based Burden of Obstructive Lung Disease (BOLD) study in Albania [2]

## Material and method

### Target population

A nation-wide representative sample was drawn. Target population was non-institutionalized adult men and women aged  $\geq 40$  years.

### Sampling procedure

A multi-stage cluster sample of 1200 individuals (600 men and 600 women) aged  $\geq 40$  years was drawn based on the sampling frame (alias the target population) available from the National Institute of Statistics (INSTAT), which consisted of 1,168,721 men and women aged  $\geq 40$  years using year 2004 Census data about population in Albania. It was BOLD Coordinating Center approved and based the BOLD criteria of generalizability of target population meaning that that area should have a total population of all ages of at least 150,000 people.

## Recruitment of participants

Participants were contacted through home visits. Individual in our study were randomly selected but in a systemic approach reaching only those that were easy find. Our recruitment approach was based on family physician registry. Clustering process was made based on BOLD sample PLAN: strata 1- random selection of 3 prefectures out of 12 nationwide; strata 2 - random selection of adults  $\geq 40$  years living in already selected prefectures, further substratified accorded to their gender and place of residence, rural vs. urban.

## Study measures

Spirometry was done using the ndd EasyOne™ spirometer, compliant with American Thoracic Society spirometry standards. Measurements were made before and at least 15 min after two puffs of albuterol (200 mg) administered via a metered-dose inhaler. Spirometry data were sent electronically to the Coordinating Center in London City, UK, where each spirogram was reviewed and graded using American Thoracic Society guidelines, to assure maximum quality of the data and to provide ongoing feedback regarding the adequacy of the maneuvers. Usable spirograms met American Thoracic Society acceptability and reproducibility criteria (at least two acceptable and reproducible tests for both FEV1 and FVC). To calculate the percentage of predicted values for the analysis, reference equations from the NHANES III were used.

## Questionnaire Data

Presence of self-reported cough was assessed using the following question: "Do you usually cough when you don't have a cold?" Self-reported phlegm was based on the answer to the following question: "Do you usually bring up phlegm from your chest, or do you usually have phlegm in your chest that is difficult to bring up when you don't have a cold?" Presence and severity of self-reported dyspnoea was recorded according to the modified Medical Research Council (mMRC) dyspnoea scale (0–4). Severe dyspnoea was defined as mMRC grade 3–4. These questions were

part of BOLD core questionnaire which contained information on welfare, educational and health status, respiratory symptoms and diseases, medication use, co-morbidities, risk factors for COPD including smoking status, health-care utilization, and activity limitation.

### Definitions

Demographic data included in this analysis were age, gender, urban vs. rural and educational status. The study participants were classified based on Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria and post

bronchodilator spirometry: normal (no respiratory symptoms or airflow obstruction or restriction); GOLD stage 0 (the presence of symptoms of cough, sputum, wheeze, or breathlessness without airflow obstruction or restriction); GOLD stage 1 or higher when post-BD FEV1/FVC < 70% and post-BD FEV1 < 80% of predicted; GOLD stage 2 when post-BD post-BD FEV1/FVC < 70% and post-BD FEV1 50 to 80% of predicted; GOLD

stage 3 or 4 when post-BD FEV1/FVC < 70% and post-BD FEV1 < 50% of predicted); and restricted (FEV1/FVC 0.70 and FVC < 80% of predicted). For study purpose, participants with spirometers showing obstructive pattern were grouped as GOLD stage 1 and higher into a single "obstruction" group with a further subdivision as GOLD stage 2 and higher. In the analysis were included estimated population prevalence of chronic cough and chronic phlegm by age and gender, estimated population prevalence of self-reported chronic bronchitis by age and gender. Based on smoking status participants were classified as current smokers, former smokers, or never-smokers based on self-reported history.

### Statistical Analysis

Logistic regression was used for evaluation of gender -differences and all results were adjusted for smoking status (current, ex- or never-smoker), age, and body mass index.

Gender	Age				Total
	40-49	50-59	60-69	70+	
Male	8.1 (3.5)	11.2 (1.3)	23.9 (4.2)	25.8 (8.2)	14.7 (2.3)
Female	3.2 (1.4)	2.9 (1.3)	5.1 (3.7)	21.3 (6.8)	6.6 (0.9)
Total	5.6 (1.9)	7.1 (1.0)	14.5 (3.5)	23.3 (5.3)	10.6 (1.3)

**Table1. Estimated Population Prevalence (SE) of Chronic Cough<sup>1</sup> by age and Gender for Tirana, Albania**

Reported cough for three months or more per year

Gender	Pack - years				Total
	Never Smokers	0-10	10-20	20+	
Male	1.7 (1.3)	1.1 (1.4)	12.2 (8.3)	26.0 (3.3)	14.7 (2.3)
Female	4.1 (1.6)	0	50.4 (11.0)	29.0 (5.5)	6.6 (0.9)
Total	3.4 (1.2)	0.6 (0.7)	28.0 (8.4)	26.1 (3.2)	10.6 (1.3)

**Table2. Estimated Population Prevalence (SE) of Chronic Cough<sup>1</sup> by pack-years and gender for Tirana, Albania**

Reported cough for three months or more per year

Gender	Age				Total
	40-49	50-59	60-69	70+	
Male	1.7 (1.2)	2.3 (1.4)	4.3 (1.8)	8.7 (5.6)	3.4 (1.9)
Female	1.3 (0.9)	0.3 (0.3)	0	0	0.5 (0.3)
Total	1.5 (0.8)	1.3 (0.7)	2.1 (1.0)	3.9 (2.6)	2.0 (1.0)

**Table3. Estimated Population Prevalence (SE) of Chronic Phlegm<sup>1</sup> by age and gender for Tirana, Albania**

1. Reported phlegm for three months or more per year

Gender	Pack - years				Total
				20+	
Male	0.5 (0.5)	0	7.1 (8.6)	5.4 (3.0)	3.4 (1.9)
Female	0.6 (0.4)	0	0	0	0.5 (0.3)
Total	0.6 (0.3)	0	4.1 (4.7)	5.3 (2.9)	2.0 (1.0)

**Table 4. Estimated Population Prevalence (SE) of Chronic Phlegm<sup>1</sup> by pack-years and gender for Tirana, Albania**

1. Reported phlegm for three months or more per year

group; 0 vs. 15.4 (3.0) in 20+ pack-years group].

## Results

Overall, male gender was associated with increased odds for reported chronic cough at any group age [Total: 14.7 (2.3) vs. 6.6 (0.9)]. This difference is very much reduced in the group age 70+ years old [25.8 (8.2) vs. 21.3 (6.8)]. In the contrary when we used the estimated population prevalence of chronic cough by pack-years and gender, female gender was associated with increased odds for reported chronic cough especially in the 10+ pack-years groups [50.4 (11.0) vs. 12.2 (8.3) in 10-20 pack-years and 29.0 (5.5) vs. 26.0 (3.3) 20+ pack-years] indicating a increased smoking susceptibility of female sex.

In contrast, female gender was associated with decreased odds for reported phlegm. Even for the same pack-years of smoking, female gender is associated with decreased odds for reported chronic phlegm [0 vs. 7.1 (8.6) in 10-20 pack-years

## Discussion

This is in accordance with results from the Confronting COPD International Survey, which showed that despite lower pack-years of smoking females were more likely to report cough and less sputum [4]. Females are held to an expectation of beauty and youthfulness, whereas males are expected to be physically strong and robust. These expectations may be disrupted by COPD [9]; however, these expectations may influence the perception and expression of respiratory symptoms in males and females. Thus, males might be less likely to describe themselves as breathless than females, and females might be less likely to report sputum or phlegm production.

## Conclusion

Physicians need to recognize that although a female may not report sputum or phlegm produc-



tion and a male may not report dyspnoea, a diagnosis of COPD should still be considered. Knowledge of this difference in reporting symptoms is

important as symptoms often are the first step to a diagnosis of underlying airway disease.

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# Management of C4-C5 Fracture with Approach 360° Without the Spinal Instrumentation

## Case Report

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## Abstract

**Introduction:** Usually, cervical pedicle screw fixation has been considered too risky for neurovascular structures. The purpose of this case report is to present a young male patient who suffered a C4-C5 fracture after a motor vehicle accident treated with a 360° surgical approach without spinal instrumentation.

**Case report:** A young male patient suffered a motor vehicle accident driving the vehicle without seat belt. Instantly after the accident he reports about severe neck pain, inability to move his left extremities, difficulty moving his right extremities, burning pain. All patients had various degrees of cord injury, and they were classified according to the American Spinal Cord Injury Association (ASIA) Impairment Scale and Denis classification.

**Results:** We present this young patient, where the selected surgical approach without using spinal instrumentation resulted has favorable outcome.

**Conclusion:** Surgical options regarding to cervical spine fractures include stabilization and decompression with and without spinal instrumentation. Carefully selected cases may be treated safely without instrumentation avoiding potential complications of spinal instrumentation such pseudoarthrosis, instrumentation failure, infection, etc.

**Keywords:** Lower cervical spine, Fracture-dislocation, Classification regarding ASIA,

## Introduction

Since 2005, the most common causes of spinal cord injury (SCI) remain: (1) motor vehicle accidents (40.4%); (2) falls (27.9%), most common in those aged 45 y or older. Spinal cord injury (SCI) due to trauma has major functional, medical, and financial effects on the injured person, as well as an important effect on the individual's psychosocial well-being.

## Methods

We present a case report of a young male patient who suffered a C4-C5 fracture after a motor vehicle accident treated with a 360° surgical approach without spinal instrumentation.

## Results

We present this young patient, where the selected surgical approach without using spinal instrumentation resulted has favorable outcome.

## Discussion

In cases of cervical traumatic fractures in carefully selected patients spinal instrumentation is not necessary, avoiding the high risk of infection and pseudoarthrosis.

## Medical History

A young male patient suffered a motor vehicle accident driving the vehicle without seat belt. Instantly after the accident he reports about severe neck pain, inability to move his left extremities, difficulty moving his right extremities, burning pain.

- **Neurological examination revealed:** asymmetrical tetraparesis with superior extremity 4/5 flexion, 3/5 extension. Inferior extremity 3/5 flexion, 3/5 extension at the right, superior extremity 1/5 flexion, 0/5 extension. Inferior extremity 1/5 flexion, 1/5 extension at the left.

Sensibility: hypo sensibility from C6 dermatome and below without anesthetic areas.

Proprioceptive sensibility was present.

The patient was unable to control the sphincters.

- Classification regarding ASIA (Frankel I modified) was : Type B

Classification of the lesion: Type D II lesion asymmetrical, with rotator vector in one side, articular fracture-dislocation disc-ligament instability and anterolyshtesis.

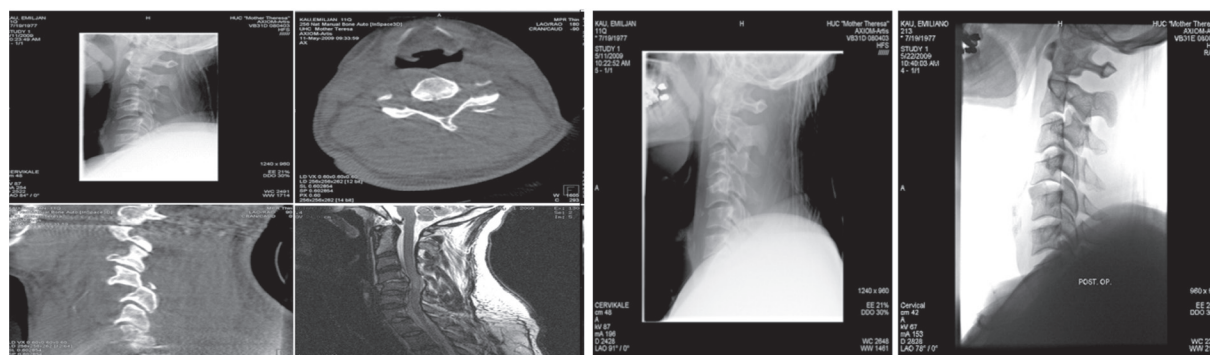


Figure 1. Imaging studies before and after the surgical procedure.

## Surgical approach

Initially posterior approach, skin incision over the spinous processes of the C3-C5 vertebrae, skel-etization on the left, the dislocation between articular fascets was identified and with the help of a spatula the inferior C4 articular fascet was

put back in the normal anatomical position.

Second step: anterior approach with dicectomy and herniectomy at C4-C5 level, three-cortical bone graft was harvested from illiac crest and was placed between C4 and C5 vertebrae.

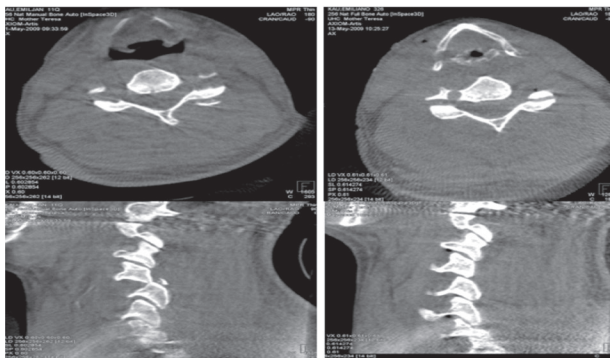


Figure 3. 3D riconstruction after the surgery.

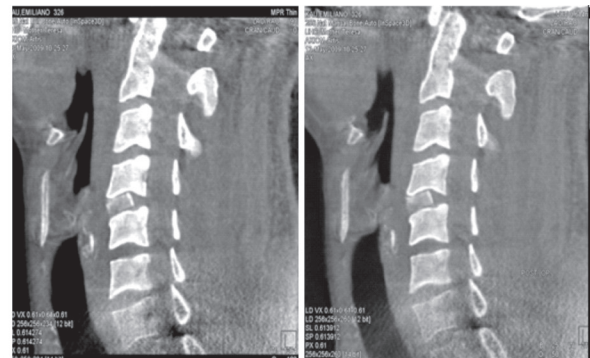


Figure 2. 3D radiographs before and after the surgical procedure.



Figure 4. T2 weighted MRI before and after the surgical procedure.

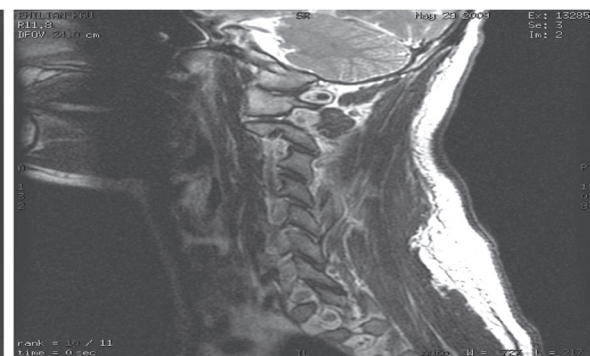
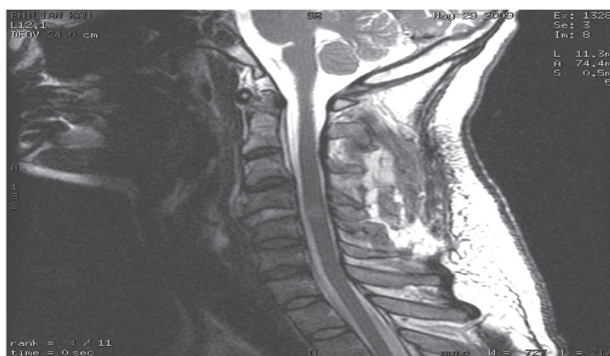


Figure 5. MRI after the surgical approach.

## Discussion

The spinal instrumentation in this era of modern surgery is widely practice in treatment of spinal diseases. Although the excellent results in spinal instrumentation, the morbidity and mortality is not negligent. In cases of cervical traumatic fractures in carefully selected patients spinal instrumentation is not necessary, avoiding the high risk of infection and pseudoarthrosis.

In the reported case, the patient was immobilized with rigid cervical collar for six weeks after the surgery.

Periodic follow up (two and six months after the surgery) showed marked improvement in neurological examination with complete recovery of motor function and minor sensory disturbances.

## Conclusion

Surgical options regarding to cervical spine fractures include stabilization and decompression with and without spinal instrumentation. Carefully selected cases may be treated safely without

instrumentation avoiding potential complications of spinal instrumentation such pseudoarthrosis, instrumentation failure, infection, and other complication as well.

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# Homocysteine and Risk of Premature Coronary Heart Disease

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## Abstract

**Background:** Homocystinuria is a rare autosomal recessive disease complicated by early and aggressive occlusive arterial disease. This may be related to the grossly increased homocysteine concentrations seen in this disease. More recently, milder hyperhomocysteinemia has been proposed as an independent risk factor for coronary artery disease. Cardiovascular disease (CVD) is among the diseases with multiple contributing factors, hence making it difficult to pinpoint a particular factor alone. The main factor that is of relevance to this study is homocysteine. Coronary artery disease is the narrowing or blockage of the arteries and vessels that supply oxygen and nutrients to the heart (1, 2). CVD are the major cause of morbidity and mortality worldwide. Obesity, HTA, Diabetes mellitus, hypercholesterolemia and smoking have been recognized as major risk factors for CVD.

**Aim:** Aim of this paper is to examine concentrations of Hcyt and lipid profile in patients with CVD and positive personal history for CVD, comparing them with the control group composed from healthy individuals. Our study aimed to verify the role of Homocysteine as new independent risk factor on the onset of early atherosclerosis and atheromatous processes in coronary arteries in patients with CVD.

**Materials and methods:** The results obtained represent the average value earned once every three months in the 3 year period. 5ccm serum with a few heparin spots was sent to the Clinical Laboratory of the University Clinic of Skopje.

**Results:** The results obtained from patients with CVD and control group are presented in the following text, where a statistically significant difference was observed for  $p < 0.0001$  between the parameters obtained by patients with CVD compared to the control group. In Concentrations of homocysteine and lipids in patients with CVD compared to the control group showed statistically significant difference with  $p < 0.0001$ , expected results and verified in many other multicentric studies. These facts show that raised Hcyt have more impact on the onset of CVD. When Hcy levels are in blood, the activity of cystathionine-synthetase enzyme is raised. It is believed that this enzyme plays vital role on the metabolism of Hcyt. Recent years a lot of studies have been made on the effect of hyperhomocysteinemia and its impact on the onset of coronary and all have verified that hyperhomocysteinemia is a significant parameter for the onset of early atherosclerosis of coronary and CVD(6,7,8).

**Conclusions:** In above mentioned cases it is recommended substitutive therapy with folic acid, pyridoxine, vitamin B12, vitamin E and other antioxidants which is found that have effect on prevention

of premature atherosclerosis in patients with CVD and raised Hcyt: acute myocardial infarction, CARB, angina pectoris. PTCA, Stenting and prevention of stroke.

**Keywords:** *premature coronary heart disease, total homocysteine*

## Introduction

Both markedly and mildly elevated circulating homocysteine concentrations are associated with increased risk of vascular occlusion. Here we review possible mechanisms that mediate these effects. Inborn errors of homocysteine metabolism result in markedly elevated plasma homocysteine (200–300  $\mu\text{mol/L}$ ) and thromboembolic (mainly venous) disease: treatment to lower but not to normalize these concentrations prevents vascular events. Mild homocysteine elevation ( $>15 \mu\text{mol/L}$ ) occurs in  $\approx 20\text{--}30\%$  of patients with atherosclerotic disease.

A new class of emerging risk factor is elevated plasma homocysteine level. This study aims to determine whether there is any significant association between homocysteine lipid profile and other parameters in acute coronary artery disease. CVD still remain as main factor of invalidity, morbidity and mortality in developed and developing countries. Usually, this is easily normalized with oral folate and ongoing trials are assessing the effect of folate treatment on outcomes. Although there is evidence of endothelial dysfunction with both markedly and mildly elevated homocysteine concentrations, the elevated homocysteine concentration in atherosclerotic patients is also associated with most standard vascular risk factors, and importantly, with early decline in renal function, which is common in atherosclerosis. Atherosclerosis, and its most common manifestation, coronary artery disease (CAD), are rather common causes of morbidity and mortality worldwide. Recognition of its various risk factors is important to planning effective preventive measures. After the homocysteine theory was presented in 1969, attention has been directed toward the serum homocysteine level as a coronary artery disease risk factor. Correlation between raised Hcyt and CVD was disovered 25 years ago by Carson and Neil, who saw a defect of

Hcyt metabolism in a patient with raised Hcyt. In this cases is verified lack several enzymes which enable normal metabolism of Hcyt. Therefore as result of these metabolic disorders of Hcyt, clinical picture of raised Hcyt and its accumulation in blood-hyperhomocysteinemia appears. Several studies have verified that 15-30% of cases with CVD are result of hyperhomocysteinemia (3, 4, 5).

When hyperhomocysteinemia is correlated with lipid disorder (dyslipidemia, hypercholesterolemia) effects on cardiovascular system and CVD prevalence is higher. For this reason we decided in our study to include lipid panel also in patients with CVD. Homocysteine has been recognized as a risk factor as early as 1990s, for the presence of atherosclerotic vascular disease and hypercoagulability states. Subgroup analyses conducted in a study also showed that elevated homocysteine was associated with higher risk of coronary artery disease in patients with chronic renal dysfunction (9, 10). Cardiovascular diseases (CVD) as the name suggests, comprise of diseases of the heart and blood vessels. Cardiovascular disease is believed to account for one third of all deaths worldwide, and the prevalence is still on the rise (11, 12). CVD and their high mortality still remain as big problem and with high prevalence in general population. High concentrations of Hcyt in serum are considered as risk factor for CVD and can be associated with hypertension.

Although between hyperhomocysteinemia and CVD is found a significant correlation, still the role of homocysteine on cardiovascular manifestations remains unclear. It is verified that concentrations of homocysteine increases with smoking, aging and some diets with low folates, cyanocobalamin and pyridoxine. Many studies have verified a significant relationship between raised Hcyt and arterial hypertension and lipid disorders, compared with normotensive individuals. Lowering Hcyt con-

centrations can have some benefits in decreasing the risk of CVD in old age correlation between high levels of homocysteine(Hcy) and coronary artery diseases is discovered 25 years ago, when for first time was verified that patients with hyperhomocysteinuria are potential candidates for developing early atherosclerosis in puberty and before 20 years of age. In these cases is verified the lack of some enzymes responsible for metabolism of Hcyt, as result hyperhomocysteinemia occurs. Homocysteine was discovered in 1932, and chemical analysis showed similarity with cysteine. For this discovery Vincent du Vigneaud in 1955 was awarded Nobel Price in Chemistry for his work on sulfur components, especially for synthesis of polypeptide hormone (13).

Homocysteine is sulfuric amine as intermediary product of normal biosynthesis of methionine and cysteine (4). Hcy in serum is found in three forms: 1% is in free form, 70-80% as residual disulfides and 20- 30% in combined form with other thios. (14). Homocysteine is synthesized from essential amino acid methionine. Cystathionine- $\beta$ -synthetase is an enzyme, while pyridoxine (B6) is essential cofactor which converts homocysteine in cysteine. Hyperhomocysteinemia is a condition with raised homocysteine levels in blood above 15  $\mu\text{mol/L}$  (15,16, 17,18). CVD have high prevalence and still remain as main reason for high mortality and morbidity in world. Etiology of CVD is multifactorial and most often they are result of narrowed or occluded coronary arteries (19, 20). Researchers have long debated the extent to which Hcy should be considered as a risk factor for CVD, since according to some, only 50% of CVD can be explained by "classical" risk factors, and they say that "new" risk factors could significantly boost the CVD predictive power. But this has been widely criticized and there are other authors who show that up to three quarters of coronary heart disease (CHD) events, if not more, could be attributed to "classical" risk factors. For the purpose of use as a screening tool, a risk factor should be strongly and causally associated with the target disease, and many authors doubt whether such a relationship between homocysteine and CVD exists.

The Framingham risk score (FRS), known as an important instrument in predicting coronary artery disease in patients with traditional risk factors, such as dyslipidaemia, hypertension, diabetes mellitus (DM), and smoking, seems to have underestimated the coronary artery disease risk in individuals with high homocysteine plasma levels. Research has indicated towards a relationship between moderately elevated tHcy (Total homocysteine) levels and the risk of CVD (coronary, heart, cerebrovascular and peripheral artery diseases). The homozygous mutation of C677T can cause severe hyperhomocysteinemia where homocysteine concentration is up to 40-fold of the normal levels. This disease occurs in approximately 1 of 100,000 live births. Also Hcy levels correlated significantly with increasing severity of coronary artery disease ( $p < 0.001$ ).

According to this paper, the most common and plausible mechanism for increased risk of CAD are endothelial dysfunction thought to occur primarily from changes in vascular endothelial compliance and platelet coagulation changes that promote CVD. In various in vitro studies, homocysteine was proved to trigger proliferation of vascular smooth muscle cells. It also has role in increasing the activity of HMG Co A reductase which in turn increases cholesterol synthesis (23). An increased cholesterol level promotes atherosclerosis and hence it is a risk factor for CAD. Serum levels of homocysteine were found to be significantly higher in CAD than in non CAD subjects. Increased serum Hcy levels positively correlated with severity of CAD. But the authors assert too that there is a correlation between homocysteine and coronary artery disease, despite the fact that every research, including this one, has its limitations. Carotid intima-media thickness (IMT) is a well-accepted non-invasive marker of subclinical atherosclerosis.

The role of homocysteine in endothelial dysfunction is thought to be mediated by mechanisms including oxidative stress, nuclear factor-kB (NF-kB) activation, inflammation, and inhibition of endothelial nitric oxide synthase (eNOS) (24). While several observational studies have reported weak positive associations between total homocysteine

ine concentration and carotid IMT in the non-diabetic population, few cross-sectional studies address this association in the context of diabetes mellitus. The possible mechanisms explaining the relationship between hyperhomocysteinemia and aortic stiffness are not yet fully well established. Main hypotheses based on this investigation are that homocysteine plays a potential role in remodelling of the arterial wall leading to vascular damage. There is also a strong evidence that oxidation is part of the mechanism attributed to increased homocysteine and atherosclerosis. Thus we see a common belief across many papers that an inflammatory response could be in play. In an experimental study on mini pigs, mild hyperhomocysteinemia was found to cause an arterial, site-dependent deterioration of the elastic structure involving metallo-proteinase-related elastolysis (25, 26).

Hyperhomocysteinemia is because of homozygote mutations of MTHFR-methylene tetrahydrofolate reductase. These individuals with MTHFR defects are exposed to early CVD. Homocysteine is independent risk factor for early atherosclerosis. Atherosclerosis is progressive inflammatory injury or arterial intimal layer, with increased permeability, lipidic deposition and calcification of intima. Correlation between hyperhomocysteinemia and atherosclerosis for first time was identified by McCully in 1969. Atherosclerosis is common pathological process which leads to CVD (myocardial infarction, atheromatous processes of carotid arteries, heart failure, stroke). Some of mechanisms of these effects are: endothelial dysfunction, oxidative injury, increased collagen production, damage of arterial wall and increased C reactive protein in vitro and in vivo (27, 28, 29). Concentrations of homocysteine in serum can be increased in different diseases which cause disturbance in the metabolism of folates, B6, B12, lipids, lipoproteins, inflammation etc.

Prevalence of hyperhomocysteinemia can vary between different populations and is tightly dependent on age, diet, genetic predisposition while in turn physical activity, moderate consumption of alcohol, folates and B12 are associated with lower levels of Hcyt. Many studies have found

that vegetarians can have higher risk for hyperhomocysteinemia compared with non vegetarians because of lower B12 levels in their diet. There are studies which have verified that in uremic patients increased Hcyt for 1  $\mu\text{mol/L}$  increases the risk for CVD 1% (31). Still unknown remains the impact and atherosclerotic effect of raised Hcyt, but it is believed it interferes with endothelial function, coagulation and platelets.

Studies have demonstrated significantly higher plasma homocysteine levels in patients with occlusive arterial disease than in controls. The causes are not clearly understood but may include deficiency of vitamin B6, vitamin B12, and folic acid and heterozygosity for cystathionine synthase deficiency. Vitamin supplementation can lower plasma homocysteine levels. These data show that hyperhomocysteinemia is related to CAD as an independent risk factor. In individuals without any risk factors a linear correlation between homocysteine level and numbers of coronary artery involvement was present. If this equation is confirmed prospectively in other studies, the level of plasma homocysteine may be used as a noninvasive way of predicting the number of diseased coronary arteries.

### Material and method

As a working material, blood was taken from the patient's vein and the control group at 8 o'clock at room temperature of 19-24°C, in an extended position, after 12 hours of hunger. tHcy and lipid profiles were analyzed in 200 of which 120 were men of average age of 57.60 $\pm$ 10.00 years, while 80 were females of average age of 58.70 $\pm$ 12.00 years.

The control group consisted of 180 individuals, of whom 100 were males and 80 females with mean median age=58.70 $\pm$ 15.20. The results obtained represent the average value earned once every three months in the 3 year period. Serum with a few heparin spots was sent to the Clinical Laboratory of the University Clinic of Skopje.

Total pts N <sup>o</sup> =200	The average age ± SD	Control group N <sup>o</sup> =180 pts, ± SD
M=N <sup>o</sup> -120	57.60 ± 10.00	58.70 ±15.20
F=N <sup>o</sup> -80	58.70 ± 12.00 years	58.70 ±15.20

Table 1: Number of patients and control group by mean age and gender

With a family history for CVD	160(42.8%)
APNS	40 ( 9.50 %)
Status post Infarctum Myocardi	40 ( 9.50 %)
Smoker	140 (48 .50 %)
Control grup-180, The average age ± SD	58.70±15.20

Table 2: Tabelary presentation of patients by CVD

Concentrations of Hcyt were determined according to Miller's method of American Immunofluorescence with Immulite DPC machine, and normal ranges are =5-13  $\mu\text{mol/L}$ , while lipid profile was determined by standard routinely methods.

### Statistical analysis of the examined material

Statistical basic methods that were used are the arithmetic mean value and standard deviation  $\bar{X} \pm \text{SD}$ . Comparative statistics and tHcyLPL and lipid parameters between the two groups was analyzed by test called STUDENTOV and for examples of dependent or independent and non-parametric tests were used the tests: Mann-Whitney and Wilcoxon's test.

Statistically significant the differences between the Group of patients and control group obtained the values of lipid parameters and test tHcy analyzed the so-called, Anonova Two-Factor "with the amounts of domestic statistics for  $p < 5\%$ , Namely  $p < \text{statistical } 0.0001$ . The results of the lipid profile and Hcys presented in the form of graphicones, averages and proportional /  $\bar{x}$ ,  $p$  /) were tested with accuracy higher than 95%, or rather, for  $\text{mr.} > \text{SEM } 1.78$ . The results of the lipid profile and Hcy are presented in the form of graph-cones, table and in the form of processed diagrams made with standard statistical program.

### Results

	Tot.Pts.	ChT mmol/l	TG mmol/l	HDL-ch mmol/l	LDL-ch mmol/l	tHcy $\mu\text{mol/l}$
Patients with CVD, St.post MI, APNS	200	5.80 ± 2.80	3,40 ± 0.80↑	0.90 ± 0.20↑	4.80 ± 1.70↑	28.60 ± 10.40 ↑
Control group	180	4.80 ± 1.50	1.15 ± 0.70	1.40 ± 0.80	3.40 ± 0.90	6.80 ± 2.70
<i>p</i>		0.7600	0.0001	0.0001	0.0001	0.0001

Table 3: Obtained results from patients with CVD and control group for tHcy and lipid profile

\*Pts-Patients. From the table itself, there is an increase in Hcy in patients with CAD (28.60 ± 10.40) compared to the control group for  $p < 0.0001$ .



## Discussion

Homocysteine as risk factor for CVD, stroke, thrombotic processes, vascular hypercoagulability and atherosclerotic processes is known since early 1990. Scientists thought on homocysteine as risk factor on developing CVD still are controversial. Some scientists believe high concentrations of Hcyt are not a risk factor for CVD, while lot of research results show high positive correlation between raised Hcyt and CVD diseases. Genetic mutations of C and S homozygote can cause severe hyperhomocysteinemia where Hcy concentrations are 40 times higher than normal. This disease have incidence of 1:100.000. Another rare genetic cause of hyperhomocysteinemia is because of homozygote mutations of MTHFR-methylene tetra hydrofolate reductase. These individuals with MTHFR defects are exposed to early CVD. Cardiovascular disease is believed to account for one third of all deaths worldwide, and the prevalence is still on the rise. CVD is among the diseases with multiple contributing factors, hence making it difficult to pinpoint a particular factor alone. The main factor that is of relevance to this study is homocysteine. Coronary artery disease is the narrowing or blockage of the arteries and vessels that supply oxygen and nutrients to the heart (11, 13).

Homocysteine is independent risk factor for early atherosclerosis. Atherosclerosis is progressive inflammatory injury or arterial intimal layer, with increased permeability, lipidic deposition and calcification of intima. Correlation between hyperhomocysteinemia and atherosclerosis for first time was identified by McCully in 1969. Atherosclerosis is common pathological process which leads to CVD (myocardial infarction, atheromatous processes of carotid arteries, heart failure, stroke). Some of mechanisms of these effects are: endothelial dysfunction, oxidative injury, increased collagen production, damage of arterial wall and increased C reactive protein in vitro and in vivo (13,14). Homocysteine is an amino acid produced via demethylation of dietary methionine, which is abundant in animal protein. It is present in plasma in four different forms: around 1% circulates as free thiol, 70–80% remains disulphide-bound

to plasma proteins, mainly albumin and 20–30% combines with itself to form the dimer homocysteine or with other thiols. Homocysteine is a key determinant of the methylation cycle. It is methylated to methionine, which undergoes S-adenosylation and forms S-adenosylmethionine (SAM).

S-adenosylmethionine is the principal methyl donor for all methylation reactions in cells (29–32). Condensation of methionine with ATP, leads to the formation of SAM (S Adenosylmethionine). Vitamin B<sub>6</sub>, B<sub>12</sub> and folic acid are essential cofactors in homocysteine-methionine metabolism.

Therefore low vitamin B availability (B<sub>6</sub>, B<sub>12</sub> and folic acid) leads to impaired re-methylation of homocysteine to methionine and thus to homocysteine accumulation. Increased homocysteine levels were found to be associated with arteriosclerotic outcomes and risk of stroke in elderly individuals, and are considered as an independent risk marker for cardiovascular diseases. However, lowering homocysteine levels by B-vitamin supplementation failed to demonstrate beneficial effects in cardiovascular diseases and this has been proven to be true in many other research works. Hyperhomocysteinemia can be caused by deficiency of folate, vitamin B<sub>6</sub> and B<sub>12</sub> in food. An individual with deficiency of these above mentioned vitamins can develop raised levels of Hcyt and have risk from hyperhomocysteinemia.

Disorders of homocysteine metabolism and other sulfuric amino acids in patients with renal injury are described in 1980 by Willen et al. for first time, who saw that uremic patients treated with HD had raised cysteine and Hcyt. High levels of homocysteine were found in patients with chronic renal injury also, with increased urea, hypothyroidism, cancer, psoriasis, diabetes, excess alcohol, smoking, coffee, old age and menopause. Homocysteine is eliminated from the organism with kidneys therefore during renal injury when GFR is decreased the excretion of Hcy from organism is decreased, which causes moderate hyperhomocysteinemia. Concentrations of homocysteine in serum can be increased in different diseases which cause disturbance in the metabolism of folates, B<sub>6</sub>, B<sub>12</sub>, lipids, lipoproteins, inflammation etc. Prevalence of hyperhomocysteinemia can vary



between different populations and is tightly dependent on age, diet, genetic predisposition while in turn physical activity, moderate consumption of alcohol, folates and B12 are associated with lower levels of Hcyt. Many studies have found that vegetarians can have higher risk for hyperhomocysteinemia compared with non vegetarians because of lower B12 levels in their diet. A new multicentric study which included 80.000 female individuals, for 14 years, found that onset of CVD was lower in the group which during that time consumed substitutive therapy with vitamins or consumed with food higher concentrations of abovementioned vitamins compared with the group who haven't consumed enough of them. Authors Victor and Hebert in their studies concluded that low levels of folic acid are as result of decreased absorption of vitamin B12 which is tightly related with old age (33). It is verified that by lowering Hcyt in serum the risk for atherosclerosis, CVD and stroke in patients with homocysteinuria decreases also. Even after many studies regarding to hyperhomocysteinemia experts still cannot conclude and verify that by lowering high levels of homocysteine decreases the risk for CVD. Regarding to this, a 4 year study in 101 patients with CVD who every day consumed folic acid, pyridoxine and cyanocobalamin found a decrease in the size of their atheromatous plaques, even better results were obtained in those patients who before the study had higher levels of Hcyt. The cause of hyperhomocysteinemia in patients with chronic renal failure still is unknown, and an appropriate therapy for normalizing Hcy in these patients doesn't exist. Experts suggest that patients with CVD should analyse their Hcyt levels, and those with levels from 9-10  $\mu\text{mol/L}$  should be treated at least one month with substitutive therapy, this has shown positive effects. A recent study on positive effects of folic acid and vitamin B12 (combined or separately) on hyperhomocysteinemia has verified that by substituting B6 and B12, organism can easily correct Hcyt levels. In USA, Canada and Europe an study with 60.000 individuals, still ongoing, are studying the effect of raised Hcyt and onset of myocardial infarction, cerebrovascular embolia and possible ways of decreasing it (34). Many studies have veri-

fied that patients after undergoing stenting or angioplasty with normalised Hcy levels have lower incidence of re-occurring of atheromatous processes compared with those who have high Hcy.

A recent study, which has lasted 6 months, a time which in patients vitamin B6 and B12 was given found that cardiac events and need for revascularisation was 1/3 time lower compared with patients who haven't consumed above-mentioned therapy (35,36). High levels of Hcyt can be as result of cyanocobalamin deficiency which occurs because of vitamin B12 malabsorption as result of gastric atrophy, which is more often seen after age of 50. B12 deficiency causes anemia. If this deficiency is left untreated it causes damage to nervous system and early atherosclerosis. Individuals above 50 years of age are advised to consume folic acid and vitamin B12 because in this age most of them have gastric atrophy. A multicentric study concluded that females during menopause have raised homocysteine and an increase of coronary diseases, compared to females before menopause (37). Consulted literature and many studies have concluded that in the etiology of coronary atherosclerosis many factors are included: genetic predisposition, environment, life style, sedentary life, obesity etc.

There are facts that by supplementing vitamin B12 has decreased Hcyt concentrations with 17-30%. For decreasing Hcy and correcting dyslipidemia intravenous application of acetylcysteine is required. Many studies have shown that by applying folic acid, vitamin B12 and B6 can reduce Hcy levels for 35%. In a larger study, it was documented that patients with coronary disease who were treated with folic acid, after 2 year follow up homocysteine decrease for 18% occurred, but mortality didn't show significant reduction. Documented facts exist that folic acid, cyanocobalamin and acetylcysteine have positive effects on decreasing homocysteine in one side and improving blood vessel function in other side. Nevertheless to verify or to dismiss abovementioned facts more studies need to be made, with more patients and more countries, so the final conclusion can be taken on the effect of folic acid, cyanocobalamin and acetylcysteine on improving

endothelial function of blood vessels (38, 39, 40). Some studies have concluded that hyperhomocysteinemia is result of conversion of hydrogen peroxide in free oxygen radicals and conversion of oxidized Hcy in Homocysteine disulfide. Effect of oxidized Hcy which is increased by hydrogen peroxide explains the LDL raise. Hydrogen peroxide causes endothelial desquamation, with inhibitory effect on prostacyclins and prostaglandins who are antagonists of platelet adhesion (28, 29, 30, 31). Homocysteine has been positively associated with both diastolic and systolic blood pressure. In case of homocysteine concentration increase of 5  $\mu\text{mol/L}$  (about 1 SD), diastolic and systolic blood pressure in men increased by 0.5 and 0.7 mmHg, respectively. In case of women, the correlation of homocysteine and blood pressure was stronger, with 0.7 and 1.2 mmHg increase in diastolic and systolic blood pressure, respectively. As mentioned earlier, high levels of homocysteine and its derivatives add to the process of modification of LDL and HDL particles, inflammation, coagulation disorders as well as fibrinolysis. Hyperhomocysteinemia may lead to biochemical effects on endothelium and cause damage to endothelial cells, diastolic dysfunction of vessels and reduction of flexibility due to its influence on vascular wall remodelling. These mechanisms may lead to an increase in blood pressure and strengthen the development of hypertension and damage body organs in patients with this disease. The question therefore exists if homocysteine is a biomarker or a risk factor? Current guidelines have not classified homocysteine as cardiovascular disease risk stratification. Although lowering homocysteine levels in individuals with pre-existing cardiovascular disease has not shown any benefit, medications as part of a primary prevention strategy need to be evaluated further for confirmation. Therefore, it seems unfair to underestimate the utility of homocysteine in cardiovascular disease risk prediction solely because interventions to lower plasma homocysteine levels have not shown a favourable outcome regarding the risk of cardiovascular disease incidence. Yet there is always room for more research to validate homocysteine as a risk factor and this is absolutely necessary for the sake of solid evidence. High

concentrations of Hcy can be normalized by substituting 1 or 2 from above mentioned deficient vitamins. Homocystinuria is genetically transmitted disease. If a patient inherits 2 defective alleles the risk is much higher than in patients who inherit 1 allele. It is verified that in 100 individuals 1 person inherits 1 defective allele. Nair et al. in a study in Indian population verified genetic mutations of Methylene-tetra-hydrofolate-reductase, which is main cause of hyperhomocysteinemia in this population.

Authors Victor and Hebert in their studies concluded that low levels of folic acid are as result of decreased absorption of vitamin B12 which is tightly related with old age. It is verified that by lowering Hcyt in serum the risk for atherosclerosis, CVD and stroke in patients with homocysteinemia decreases also. Even after many studies regarding to hyperhomocysteinemia experts still cannot conclude and verify that by lowering high levels of homocysteine decreases the risk for CVD (41-44). First, it must be emphasized that the vascular disease in homocystinuria due to cystathionine  $\beta$ -synthase (CBS) deficiency, methylenetetrahydrofolate reductase (MTHFR) deficiency, or inborn errors in cobalamin metabolism bears little resemblance to the atherosclerotic and atherothrombotic vascular disease seen in the adult general population. Atherosclerosis is characterized by a thickening of the arterial wall due to smooth muscle cell proliferation, lipid deposits, and fibrosis (1). Rupture of the lipid-containing atherosclerotic plaques results in thrombosis (atherothrombosis) and leads to myocardial infarction and stroke (1). In contrast, homocystinuria seems to be associated with a primary thrombotic disorder that affects veins more often than arteries.

## Conclusion

We can conclude that in our paper also high levels of Hcyt and lipid profile were recorded in patients with CVD. These results are in line with many other multicentric studies, on the role of Hcyt as new independent risk factor for early atherosclerosis. In above mentioned cases it is preferred substitutive therapy with folic acid, pyridox-

ine, cyanocobalamin, tocoferol, acetylsalicylates and other antioxidative agents, which clearly can prevent early atherosclerosis in CVD with: PTCA, CARB, AMI, APNS, Stenting and prevention of stroke.

The study reveals homocysteine, diabetes mellitus, hyperlipidemia, hypertension, obesity and smoking has definite role in the generation of coronary artery disease in the patients with cardiovascular disease. Though most research work suggests a relationship, yet there seems to be other evidence that still prevents its inclusion as a biomarker.

With every ten steps forward, we might have to face a step or two backward, but this should only further increase the enthusiasm of research in this field. This field definitely needs more research input until a definitive proof is available to cast off any shadow of doubt regarding the corre-

lation between homocysteine and cardiovascular disease. Nevertheless, the present review should provide some insight into the role of homocysteine in the development of cardiovascular disease summarizing both central and peripheral effects of homocysteine.

The authors feel that it is necessary to combat the ill effects of hyperhomocysteinemia as it has a pivotal influence on the pathology of the diseased process.

The published literature indicates that homocysteine is an independent cardiovascular disease risk factor modifiable by nutrition and exercise. Whether measuring plasma homocysteine levels in patients with coronary artery disease should be routine and whether treating hyperhomocysteinemia in these patients may reduce the risk of coronary events remains to be determined.

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# Intraperitoneal Amikacine Provoked Perceptive Deafness in CAPD - Continuous Ambulatory Peritoneal Dialysis Patient

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## Abstract

Peritonitis (P) is the main complication and primary limiting factor in the extension of continuous ambulatory peritoneal dialysis (CAPD) in developing countries, because of exposure to potential external contamination, especially in people with unsatisfactory hygiene habits. We will present a case of peritonitis in a 62-year-old woman after the first three months of CAPD treatment. The peritoneal infection is confirmed by cloudy fluid with increased WBC in the dialysis solution (2300..1300..1100 cells/cmm; polymorphonuclears between 60% to 80%), augmented fluid protein content (cca. 2.4 g/l), presence of microorganisms and symptoms of acute peritoneal infection (isolated *Enterobacteria* species, abdominal pain and diarrhoea). The peritonitis was treated following the Oreopoulos group's recommendations<sup>1</sup> and after a report of the sensitivity of the isolated *Enterobacteria*, with appropriate antibiotic (Amikacine) in recommended intraperitoneal dose. Three days after successful treatment of peritonitis, the definite deafness is developed.

**Keywords:** CAPD, peritonitis, intraperitoneal amikacine

## Introduction

Peritonitis is one of the most frequent and flared complications of CAPD therapy. It provokes morbidity causing difficulties in dialysis process and by repeated attacks may lead to peritoneal membrane sclerosis, loss of ultrafiltering capacity, inability to dialyze and, finally, that is a risk of increasing mortality. Therefore, the improvement in peritonitis prevention, early detection of disease and efficacious treatment are of paramount importance. The aim of our paper is to present the possibility of toxic medicamentous effect in practical clinical work using well known antibiotics, broadly indicated in the treatment of CAPD associated peritonitis (CAPD-RP) in the precisely recommended dose regimen.

## Case report

Mrs A.C., 62 years old woman, hospitalized in Nephrology Department(intensive care unit, ICU) because a worsed chronic renal failure as a consequence of insulin requiring diabetes mellitus many years ago. Several months before, she was submitted to chronic hemodialysis replacement

therapy(CHD).

At the admission in ICU, she presents with hyperhydratation, congestive heart failure, atrial fibrillation and uremic fibrinous pericarditis. Because of frequent and prolonged hypotonic intra-hemodialytic episodes associated with repetitive precordial pain crisis, the hemodialysis process was very often aborted and flared uremic state emerged (polyse-rositis, pericarditis). After 6 days intensive care unit treatment, the CAPD therapy was proposed as a better replacement dialysis procedure. The Tenckoff catheter was inserted into the Douglas space and the patient was submitted to learn the basic principles of CAPD therapy procedure. After three months successful CAPD treatment, the patient consults our department one time more, in pronounced generalized septic state accompanied by fever, elevated corporal temperature (more than 39°C), abdominal pains, diffuse abdominal resistance and other objective parameters defining diffuse peritonitis. The characteristic signs for evolution of CAPD-RP are presented in the following table.

## EVOLUTION OF CAPD-ASSOCIATED PERITONITIS

DAYS OF TREATMENT							
	I	II	III	IV	V	VI	VII
View of effluent (+,-)	++++	++++	+++	++	+	-	-
Number of WBC (/cmm)	2300	2000	1300	1100	600	300	180
Fluid proteins (g/l)	2.4	2.0	1.2	1.1	0.5	0.2	0.15
Isolated germs (Enterobacteria)	++	+	-	-	-	-	-
Clinical state	pain	pain	tenderness	-	-	-	-

In the sediment of peritoneal effluent, the first day of the disease, more than 80% inside present cells were polymorphonuclears and in the following days the percentage was dimin-

ished (60%, 50%) with augmented number of peritoneal macrophags.

Immediately after detection of CAPD-RP (positive culture from peritoneal effluent) and pa-

tient admission to the hospital, the treatment was beginning following the recommendations of Oreopoulos' group (1981)<sup>1</sup> and guidelines proposed by Keane WF et al. (1989).<sup>2</sup>

The antimicrobial therapy was initiated with amikacine (aminoglikozide with minimal toxicity) in the loading dose of 500 mg per two liters dialysis solution, followed by maintenance doses of 150 mg/day in the next seven days. Simultaneously, cephalotin sodium was used in the loading dose of 1000 mg/2 l dialysis solution followed by maintenance dose of 200 mg/2 l dialysis solution (four times daily, with each exchange). Routinely heparinization was practiced (1000 U per dialyzate bag) to prevent intraperitoneal and pericatheter fibrin deposition. Following the Keane's prescription, cephalosporin and aminozide were separately introduced in the peritoneal cavity (in different bags).

In the beginning of the treatment, the change of the dialyzate solution was realized every three hours (in all three changes following the type "in and out"), and thereafter as usual every 5-6 hours. Immediately before the intraperitoneal medicaments application, the patient was loaded with amikacine 7.5 mg/kg/bw (500 mg, i.v.).

After differentiation of microorganism (*Enterobacteria species*) and approved sensitivity to amikacine, the therapy was continued until the end of the week. Because the number of BWC in the effluent was bigger than 100 cells/cmm ( $N^{\circ} = 180$  cells/cmm), the catheter was extracted, and the treatment was continued in the next 7 days orally with tetracyclines. In the mean time the diabetes mellitus was regulated with s.c. insulin application. At the end of the treatment period (7 days), the clinical and laboratory findings of the CAPD-RP were completely retired. The subclavian catheter was placed and the chronic hemodialysis restarted once more. Three days after successful therapy of CAPD-RP, the symptoms of bilateral total cochleo-vestibular organ lesions were detected (vertigo, walking instability and definitive perceptive deafness). The special audio-vestibular testing before therapy was not accomplished, because clinically the patient has not demonstrated earlier any above mentioned symptoms

orienting cochleo-vestibular lesions (hypacusia, dizziness). The treatment recommended by otologist (mainly B group vitamins like B6 and B<sub>1</sub>) was resultless.

The dose regimen concerning amikacine was conducted following the pharmaceutical recommendations for dialytic patients (T/2=D/2) every 42 hours (or 3.5 mg/kg bw;  $3.5 \times 70 = 225$  mg). Taking into consideration the 7 days drug's administration (168 hours namely), the total permitted dose was:  $168:42 = 4 \times 225$  mg amikacine (900 mg) not including the initial peritoneal and intramuscular loading doses (500+500 mg).

Cephalotin was applied strictly following the recommendation of Keane et al (1989). In this manner, the total dose of applied antibiotics in the treatment period of CAPD-RP was 1900 mg for amikacine and 7000 mg for cephalotin (2.2 gr in the first 24 hours, and the rest of 4.8 gr in the next 6 days).

## Discussion

The CAPD-RP is the most frequent complication of peritoneal dialysis in all possible variants (acute, intermittent peritoneal dialysis and CAPD/CCPD itself). The crucial reason for this infection is dialysate contamination following the process of fluid installation or progression of microbial agent along the peritoneal Tenchoff catheter from insertion site to the peritoneal cavity. Rarely, the hematogenic dissemination is possible (about 10% of cases, mainly provoked by *Streptococcus viridans*) or perforate bowel lesion with fecal contamination. The most frequent microbial agent involved in the genesis of CAPD-RP is *Staphylococcus epidermidis* (cca 40% from all investigated cases) in the gram positive bacterial group. The gram-negative microbes are present in only 30%.

In the preclinical phase of the CAPD-RP the diagnosis is made with s.c. "leukocyte esterase sensitive test strip", increased number of dialysate polymorphonuclear leukocytes with parallel diarrheal episodes in CAPD patients, without abdominal sensitivity at the time of profound palpation. Prevention of CAPD-RP is conducted with rigor-

ous aseptic manipulation including the dialyzate instillation, better dialyzate bags connection with Tenckoff catheter and use of adequate disinfection agents. After each episode of CAPD-RP, the patient must be submitted once more to reeducational procedure. Some authors propose intraperitoneal application of gamma-interferon in attempt to augment the bactericidal capacity of peritoneal macrophages (Lamperi et al.1989)<sup>4</sup>.

Antibiotic prophylaxis is discrepant and doubtful. Probably, there is no correlation between the humoral/cellular immunity state and CAPD-RP. The IgG intraperitoneal secretion more than 14% of total blood proteins, almost every time suggests CAPD-RP occurrence. The intraperitoneal application of polyclonal IgG every three weeks, may

significantly improve the bacterial opsonization (Lamperi et al.1986)<sup>3</sup>. The developed vaccines against the most frequent encountered bacteria (coagulase negative *staphylococcus, f.i.*) have not proved completely his efficacy.

## Conclusion

The treatment of CAPD-RP is successful in the largest number of cases, but the special attention must be devoted to the following two questions: Justifiableness for combination of two potentially ototoxic drugs (in the our case: amikacine and cephalotin). Justifiableness for adjuncted loading dose (i.m;i.p.) of aminozides, which can overpass the maximal proposed dose for dialysis dependent ESKD patients.

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# Cezarean Hysterectomy, A lifesaving Procedure that Albanian Obstetricians Must Be Familiar With

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## Abstract

Cezarean Hysterectomy refers to emergency peripartum hysterectomy - EPH, which is performed as a life saving procedure in cases of continual obstetric hemorrhage secondary to uterine atony, uterine rupture, placental disorders, fibroids, and lacerations during cesarean section - CS or vaginal parturition. Emergency peripartum hysterectomy - EPH, although rare in modern obstetrics, remains a life-saving procedure in cases of severe hemorrhage. In contemporary obstetrics, overall incidence of severe postpartum hemorrhage was reported to occur in 6.7/1,000 deliveries worldwide. It is one of the leading causes of maternal mortality and morbidity and represents the most challenging complication that an obstetrician will face. The incidence of peripartum hysterectomy in the literature is reported as 0.24, 0.77, 2.3, and 5.09 per 1,000 deliveries by many authors mentioning a few; Sakse et al., White-man et al., Bai et al., and Zeteroglu et al., respectively. Nevertheless, there is a lack of Albanian data on EPH. To our knowledge, there is no Portuguese information on postpartum hemorrhage and EPH, which does not mean that we do not have such obstetrical complication and therefore such emergency intervention. This paper's intention is to bring awareness of such catastrophic obstetrical complication especially in young primigavida and primipara women.

**Keywords:** *Cezarean hysterectomy, postpartum hemorrhage, maternal, mortality, morbidity*

## Introduction

Emergency peripartum hysterectomy - EPH is an infrequent obstetric procedure, usually performed as a life saving measure in cases of intractable obstetric hemorrhage.<sup>1, 2, 3</sup> It was first proposed in 1869 but with no desirable results.<sup>4</sup> Nonetheless, seven years later in 1876, the first cesarean subtotal hysterectomy was carried out successfully, with the result that both the mother and the baby survived.<sup>1, 5</sup>

Emergency postpartum hysterectomy - EPH is defined as hysterectomy performed within 24 hours of vaginal or cesarean delivery.<sup>1, 9, 10, 11</sup> The most frequent indication for EPH in numerous studies was uterine atony, followed by morbid adherence of placenta and uterine rupture.<sup>6, 7, 8</sup> There has been a significant change in the indication of EPH over time and from one region to another. Usually, uterine atony was the most common indication for hysterectomy.<sup>6-8</sup> Recent studies have indicated that abnormal placentation is replacing uterine atony as the most common indication for EPH.<sup>5-8</sup> The rate of peripartum hysterectomy, not limited to emergent cases, is increased from 1994 to 2017 in the United States and according to Bateman et al. indicated that this increase could be attributed to the rising rate of CS.<sup>12</sup> The international recommendations for post partum hemorrhage management including the administration of oxytocin and ergometrine preparations as first line medical management in all cases.

Originally the indications for peripartum hysterectomy included uterine sepsis like amnionitis, chorioamnionitis after prolonged labour, atonia uteri or uncontrollable hemorrhage from placenta site, cancer of the cervix, extensive atresia of the vagina, preventing discharge of lochia, cases of ruptured uterus where suturing would be unsafe, uterine fibroids and tuberculosis.<sup>13</sup>

## Discussion

The first documented hysterectomy on a patient at Caesarean section was performed in United States by Horatio Storer in 1869, although, uterus was removed successfully, patient died in 68 hours after surgery.<sup>13</sup> James Blundell in 1823 based his opinion approving post-cesarean hys-

terectomy on work done with rabbits.<sup>14</sup>

In 1876, Eduardo Porro of Milan described the first cesarean hysterectomy in which both mother and baby survived, his patient was a primiparous dwarf, J. C., who was 25 years of age and was only 144cm in height.<sup>15</sup> In his procedure, the uterus was opened in situ and the child was removed alive. After removal of the placenta, an instrument called a cintrat's constrictor was passed over the neck of the uterus and the wire was sufficiently tightened to control hemorrhage and the uterus was then cut away. The stump was brought out through the abdominal wound which was closed with sutures of silver wire.<sup>15</sup>

EPH is a lifesaving procedure, particularly in cases of persistent obstetrical hemorrhage after delivery and this procedure has been advocated by obstetricians for over 100 years.

The most recent population level study shows a peripartum hysterectomy rate of nearly one per 1000 deliveries in the United States.<sup>16</sup> In addition to abnormal placentation, other significant risk factors for peripartum hysterectomy include advanced maternal age and parity, multiple gestations, antepartum bleeding, preeclampsia, bleeding disorders, and the use of assisted reproductive technologies.<sup>17-22</sup> While the majority of patients with these risk factors will experience neither major hemorrhage nor hysterectomy, patients who have multiple risk factors or a history of prior postpartum hemorrhage should deliver in a setting where hysterectomy is readily available if needed.

There are numerous risk factors that can contribute for this entity and recognizing and assessing patients at risk is very important. Also, appropriate management of cases of postpartum hemorrhage is an important issue. Ideally each labor and delivery unit has a postpartum hemorrhage protocol for patients with estimated blood loss exceeding a predefined threshold, often 1000 mL. These protocols provide a standardized approach to evaluating and monitoring the patient, notifying a multidisciplinary team, and treatment.

Some of these features that pose the difficulties with obstetric hysterectomy include; Often markedly enlarged and distended uterine and ovarian



vessels. There is generally increased blood supply to the pelvic organs in pregnancy. Pelvic tissues adjacent to the uterus are oedematous and friable. Trauma of extensive uterine rupture gives rise to gross distortion of the anatomy and edema of the area surrounding the site of rupture. Placenta previa percreta may extend into the bladder and other pelvic organs. Scarring from previous cesarean sections obliterates the utero-vesical space and makes the separation of the bladder from the uterus difficult and injury prone. The ureters may be sectioned, clamped or stitched because often, heavy bleeding interferes with proper exposure. Difficulty in identifying the vaginal angles or the cervix to complete a total hysterectomy in laboring patients where the cervix is fully dilated. The decision to perform hysterectomy is difficult especially in nulliparous women as this brings an

abrupt and unwelcome end to their reproductive career. However the delayed decision may cause more blood loss thereby increasing morbidity.

**In conclusions:** Posptpartum hemaoragy poses a dangerous process that include radical interventions like hysterectomy wich possesses complications itself not only as radical procedure but also as other processes of pregnancy and mode of delivery, patients conditionas and other pathologies involved. Thus, a carefull evaluation, and abnormal placental insertion, ealy diagnosis of posptpartum hemorrhage and proper management as multidisiplanry team is required. This is a procedure that we all obstetrician must be familiar with and especially in regional and city hospitals where infrastructure and human resources team is not always available in Albania.

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# Pulmonary Rehabilitation - PR

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## **Abstract**

Chronic respiratory diseases are associated with severe, not only pulmonary, but also systemic damage such as dysfunction of peripheral muscles, dysfunction of respiratory muscles, nutritional disorders, cardiac injuries, skeletal disorders, sensory debilities, and psychological dysfunction. Mechanisms of these injuries are many and different. Pulmonary recovery (PR) is an integral part of clinical therapy in patients with chronic respiratory disease who continue to be symptomatic or continue to have pulmonary function depression, regardless of standard medical treatment.

**Keywords:** *Chronic, respiratory, diseases, dysfunction, clinical therapy, pulmonary recovery*

## Introduction

Chronic respiratory diseases are associated with severe, not only pulmonary, but also systemic damage such as dysfunction of peripheral muscles, dysfunction of respiratory muscles, nutritional disorders, cardiac injuries, skeletal disorders, sensory debilities, and psychological dysfunction. Mechanisms of these injuries are many and different. Pulmonary recovery (PR) is an integral part of clinical therapy in patients with chronic respiratory disease who continue to be symptomatic or continue to have pulmonary function depression, regardless of standard medical treatment.

Physical exercises and enlargement of the chest cavity were first described by Charles Deninson in 1895 in "Pulmonary Injuries Exercises". In the 20th century, Alvan Barach from New York, while studying the discovery, found that "the semi-stagnant attitude diminished the feeling of dispensation [1]. We do not yet have a proper pulmonary recovery services in our hospital.

## Discussion

The Pulmonary Rehabilitation Committee of the American College of Chest Physicians in 1981 defined Pulmonary Rehabilitation as "An art of medical science where an individual multidisciplinary program, formulated on the basis of clear diagnosis, therapy, emotional support and education, stabilizes or restores psychological and psychopathological anomalies of pulmonary disease and strive to bring the patient to the highest possible functional level, allowing the pulmonary handicap and all life situations "[2,3].

Main goals of pulmonary rehabilitation:

1. Reduce the symptoms,
2. Reduce disability,
3. Increase participation in physical and social activities
4. Improve the quality of life (QOL) in patients with chronic respiratory disease.

These goals are achieved through patient and family education, exercise training, psychosocial intervention, lifestyle habits, and evaluation of outcomes. Pulmonary rehabilitation programs

are individual for each patient and are implemented by a multidisciplinary medical practitioner.

### *Patient Selection for Pulmonary Rehabilitation*

PR is indicated for patients with chronic respiratory injuries, who, regardless of optimal medical treatment, continue to have dyspnea, decreased exercise tolerance, or restriction of life activity. The indication for PR is not based on pulmonary physiological damage, but on the persistence of symptoms, disability and handicap. The main respiratory pathologies that have the indications for pulmonary resuscitation programs are:

COPD, Asthma bronchialis, Thoracic Cage Diseases, Cystic fibrosis, Bronchiectasia, Defuse pulmonary diseases, Lung Cancer, Some neuromuscular diseases, Poliomyelitis syndrome, Postoperative conditions (thoracic and abdominal surgery, pulmonary transplantation, Lung volume reduction).

Currently, the COPD continues to be the main disease involved in PR programs. Exceptional criteria include situations that interfere with rehabilitation processes or have a risk of exercise training (cognitive dysfunction, severe pulmonary hypertension, unstable angina and myocardial infarction) [4].

Application site for PR

The implementation of pulmonary rehabilitation programs can be done:

In the hospital (inpatient or outpatient)

At home

The location choice depends on the physical, functional, psychological condition of the patient; the variability and distance from the recovery center and the patient's preference. Rehabilitation in the hospital is usually recommended for patients with severe injuries due to intensive rehabilitation services and available staff. Rehabilitation in outpatient conditions may be of interest to a large number of patients. Although preliminary results have not been well studied, home rehabilitation is more appropriate for patients and the family and can provide more motivation for continued training [5, 6]. Regardless of where it is applied, the PR program, the effectiveness depends more on its structure and components

rather than where it applies.

#### *Pulmonary Rehabilitation Staff:*

Because PR is a multidisciplinary complex of medical services, it is necessary to combine the experience of a multidisciplinary staff. The staff is run by the program director, who must be a physician pulmonologist with a medical-legal responsibility for treating the patient during rehabilitation. The Director is responsible for all aspects of the program:

Selection and involvement of patients; Requesting consensus and informing the patient in writing, Individualized selection; Controlling the quality of application to programs; Continue cure and programs from the general practitioner.

The program director should be trained in cardio-pulmonary treatment; fitness exercises, ventilation, treatment of functional disorders, and to be able to work in the staff with other professionals.

Other Personnel: Nurse, Physiotherapist, who carry out the duties assigned by the doctor. A therapist for 5-6 patients in day-hospital and a therapist for very severe patients in Intensive Care Unit (mechanical ventilation) are needed.

Other staff members included:

1. Coordinator
2. Psychologist
3. Nutritionist
4. Social assistant

#### *Pulmonary recovery components*

PR programs generally have four major components:

Training

Education

Psychosocial intervention in the habits of life

Preliminary assessment

Muscle training is essential in PR programs. Exercise does not exacerbate the established pulmonary damage, but improves breathless and other parameters previously measured. Since the weakening of peripheral muscles contributes to the limitations of patients with pulmonary disease, muscle training is a component of training during PR. Lowering the muscular intensity of

the upper and lower extremities may lead to decreased pulmonary ventilation.

Fig.1: Lower extremity exercises. A regular walking graph is an important component of PR. The described distance progressively increases and the supplying of O<sub>2</sub> is necessary in cases of hemoglobin desaturation.

Training of respiratory muscles, using appropriate methods improved their strength in patients with COPD. However, it remains unclear whether this improvement reduces symptoms, disability and handicap. [7, 8].

Education is an integral part of RP programs. Education makes patients the most capable and cooperative in monitoring the disease and improves their compliance. Education is made with small groups or individuals and includes:

*Smoking cessation*

*Education to save energy by breathing quietly;*

*Using the necessary auxiliary tools;*

*Education related to the medication used (Adaptation of Therapy);*

*Optimum use of inhalers (MDI, spacer - haler, etc.);*

*Optimum use of O<sub>2</sub>;*

*Clarification of the risk of respiratory insufficiency;*

*Need for mechanical ventilation.*

Smoking cessation continues to be the most important therapeutic intervention. Many patients with SPOK have a history of smoking or continue to use tobacco. Any tobacco smoking program should involve multiple interventions [9], to help the patient to quit smoking, to prevent the resumption of tobacco use and to cooperate with the family to understand the importance of smoking cessation. Nicotine replacement therapy can be used.

The respiratory control techniques and thoracic physiotherapy are two important components of pulmonary rehabilitation at COPD, bronchiectasia and cystic fibrosis. Although smoking cessation and long-term O<sub>2</sub>-therapy prolong the life of patients with COPD, physiotherapy appears to be the same in patients with bronchiectasy and cystic fibrosis [10]. The three main techniques used

are :

*Half-closed lips expiration,*

*Postural drainage techniques*

*Diaphragm breathing*

Treatment with oral medications or inhalers is used in stable patients to reduce dyspnoea and increase exercise tolerance.

*Psychological intervention and lifestyle habits:*

Anxiety and depression are common in people with chronic pulmonary disease. Psychological intervention in the form of regular patient education, focusing on specific

problems, is important. Instructing for muscle relaxation,

stress reduction and panic control, can help lessen sleepiness and anxiety. Due to the effect of chronic respiratory disease on family members, it is beneficial for family members or friends during the PR [11].

Depression is common in those with COPD. In this case the prevalence ranges from 20-60%. Because of this are genetic predispositions, severe injuries and the effects of COPD on the SNQ.

Evaluation of the candidate for PR is necessary for the development of an individual treatment program.

Clinical history, physical examination, review of previous examinations (such as spirometry) are necessary to determine the degree of pulmonary damage. Determining basic exercise capacity is essential in determining exercises and evaluating hypoxemia during exercise. Evaluating the preliminary results is very important component of PR to determine individual patient response and evaluate the effectiveness of the program. The measurements to be performed before and after the patient rehabilitation program are:

*Dyspnoea*

*Exercise skills*

*Medical condition*

*Activity level*

Measurements should be carried out for a period of time of 6 to 12 months.

#### • Efforts and dyspnea:

- Discomfort is the most common symptom of patients with chronic pulmonary disease and major causes for medical help. Long-range dyspnea is usually measured with Borg scale or other analogous degrees. Effects during the daily activity are measured by the questionnaires described by the Medical Research Council (mMRC). Decreasing the length of the exercise evidence indicates that PR has been effective.

Specific measurements for functional pulmonary condition:

- Functional capacity is what the patient is capable of doing, and functional performance is what the patient is currently doing every day.
- The functional reserve is the difference between them. Pulmonary Rehabilitation improves patient Functional capacity. [12,13]

Exercise Tests: The progressive effort test is carried out on a cyclo-ergometer or revolving tap. Exercise continues up to a maximum heart rate of 85%. Long-lasting dyspnea can be calculated using a visual analog scale. This test is reproducible, sensitive and can be improved by PR. A long lasting time shows longer training skills [14]. 6 minutes-walking test is well correlated with performance at peak speed. A clinically evaluated minimum increase is the 54m long distance to this test.

Nutritional Evaluation: Weight loss in patients with chronic respiratory disease is a bad prognosis indicator. About 50% of COPD patients are suffering from protein and calcium malnutrition. The progressive fall in weight comes as a result of an inadequate diet, increased energy consumption, and inadequate breastfeeding. These mechanisms lead to energy disequilibrium and loss of body weight [15]. Improving nutrition during PR programs helps to improve the patient's health condition, the function of respiratory mm. and above all the feeling of being good. Obesity, which is defined as > 30% of ideal BMI, may impair pulmonary function. The increase in fat mass increases the work of the respiratory system, which is now compromised. Intervention in a patient with malnutrition and chronic pulmonary



disease consists in nutritional counseling, with the purpose of creating a planned and balanced diet and the use of supplemental foods.

Measurement of handicap and quality of life (QOL) [14]. For measuring the handicap and quality of life, these measuring instruments are used:

- *General health questions*
- *Specific rates of disease, such as those of chronic respiratory disease.*
- *St. George questionnaire*
- *Specific disease-specific measurements*

Some questionnaires can be used to determine anxiety and depression such as Diabetes Depression Inventory (DDI), geriatric depression scale (GDS).

#### *Benefits from Pulmonary Rehabilitation.*

The benefits of PR also appear in irreversible pulmonary diseases, as many of the disabilities result not from pulmonary damage but from the presence of secondary pathologies, which are often treatable if known. Although the rate of pulmonary obstruction in COPD does not change satisfactorily during pulmonary rehabilitation, it may be beneficial to improve muscle function and to walk for a longer distance with less dyspnea, increased independence, decreased hospital admissions, or dizziness with and improvement of QOL. Retrospective, studies have shown

that there is no significant difference in improving tolerance to exercise or QOL after PR in patients with COPD versus non-COPD patients. So PR is effective in patients with any disabilities, from any chronic respiratory disease and not just those with COPD [9].

#### *Cost-effectiveness of PR*

Although studies on the cost-effectiveness of PR describe it as relatively expensive, now they are considered not very accurate. A Canadian study (2005), show that implementation of the COPD program for the community for a period of 1 year was accompanied by a reduction in hospital admissions, direct cost reduction and improvement of the health care system [16]. These are strong evidence demonstrating that pulmonary rehabilitation is a therapy that lowers the cost of treating chronic illnesses.

#### **In conclusion**

In our opinion, regarding the data gathered from various studies and our experience as well, we think that pulmonary rehabilitation is not only easy accessible and doable program, but also a cost-effective and with great impact not only the pulmonary chronic diseases but it brings positive effect in the whole body in general.

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## Albanian Society of Trauma & Emergency Surgery (ASTES)

[www.astes.org.al](http://www.astes.org.al)

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### Message from President

Dear colleagues  
Dear friends of ASTES.

We have now almost 10 months of the society's activity, which was crowned with ASTES's first annual congress, an event to take an example of the organization and quality of the lectures and all inclusion in it of all the groups of health professionals involved with trauma and surgical emergency management at all its levels, with the principle "let's meet together to share our experiences ...".

During this year we are proud of ...Realization of pre-convention BLS & D course, 14 top foreign lecturers, 26 sessions divided into three parallel sessions.

Realization of ASTES membership in ESTES (European Society for Trauma and Emergency Surgery) as an "Institutional Member" crowned at ECTES 2018 in Valencia.

Launch of the first issue of the Albanian Journal of Trauma and Emergency Surgery with the International ISSN, where in 2018 we expect to publish three other volumes...

Realization of the association's website and congress...

During the work of ACTES 2017, the assembly of ASTES was gathered, where was evaluated the activity of the association and the constitution of its governing bodies where important decisions were made, as follows;

To increase the inclusion of ASTES, it was decided that the Board of Directors consists of 8 members plus AJTES Editor-in-Chief, from these two permanent representatives will be from KOSOVO, and a permanent representative from Macedonia.

The board of the AJTES magazine will have one permanent representative from KOSOVO, and a permanent representative from Macedonia...

Accepting in principle the establishment of the Balkan Federation of Trauma and Surgical Urgency and increasing the level of cooperation at all levels.

Establishing working groups for the elaboration of trauma protocols and surgical emergency at all levels as an integral part of ASTES's work.

Defining the congressional theme and the start date for sending the Abstracts from 01 February 2018...

The Slogan of the next congress in Tetovo is "Together for the future...", I hope that we will have the first step in our inspiration for the future in the development of the care of the patients with Trauma and Emergency Surgery and not only...

For the next congress we will introduce new sessions format...I'm looking forward to helping team of the organizing committee Vullnet Ameti, Nasir Behxheti, Lutfi Zylbeari, Kastriot Haxhirexha, Arben Gjata, Skender Topi, Xheladin Dracini, Skender Zatriqi, Marjan Dema, Suzana Manxhuka-Kërliu to have a successful congress next year in Tetovo.

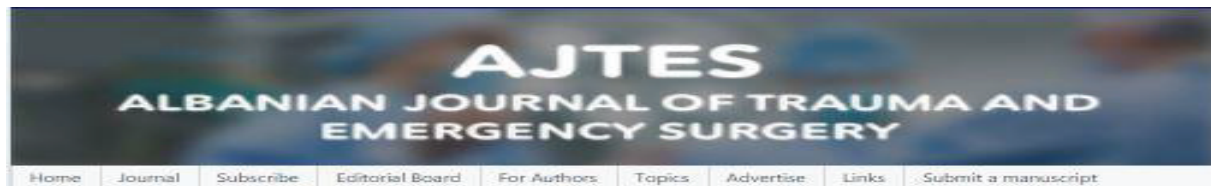
Agron Dogjani  
President  
Albanian Society for Trauma and Emergency Surgery



Pamje nga ACTES, 2017







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As we are in the process of releasing our next issue, we would like to invite you to submit your valuable article to our journal which may advance our current knowledge about Surgery and its related researches. The articles can be of Research Article, Review, Short Commentary, Case Report, Mini Review, etc.

AJTES is accepting peer review requests as well as editor board member requests, to ensure a high scientific quality of its publications.

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AJTES also welcomes all the other persons who might be interested in contributing at different fields such as translation, art designing etc. You may feel free to contact us at our e mail address: [contact@astes.org.al](mailto:contact@astes.org.al)

With Regards,

***AJTES Editorial Board***



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## Event Calendar

**Endorsed** = Events taking place in ESTES member countries and/or organized by ESTES institutional members; discount for ESTES members is granted

**Recommended** = Events taking place in non-member countries; discount for ESTES members is granted

**Recommended** = National events by institutional members or other recommended events

### February 2018

**FEB<sup>24</sup> - MUSEC: CURSO MODULAR DE ECOGRAFÍA ABDOMINAL**  
Centro Tecnológico de Formación  
Event Type: **Endorsed**

### March 2018

**MAR<sup>19-20</sup> - EMERGENCY SURGERY COURSE**  
Universitätsklinik Graz - Department of Surgery, Auenbruggerplatz 29, 8036 Graz, Austria  
Event Type: **Endorsed**

### April 2018

**APR<sup>9-10</sup> TRAUMA COURSE**  
Universitätsklinik Graz - Department of Surgery, Auenbruggerplatz 29, 8036 Graz, Austria  
Event Type: **Endorsed**

### May 2018

**MAY<sup>6-8</sup> - ECTES 2018 – 19TH EUROPEAN CONGRESS OF TRAUMA & EMERGENCY SURGERY**  
Valencia Conference Centre/ Palau de Congressos de València, Av. de les Corts Valencianes, 60, 46015 Valencia, Spain  
Event Type: **Endorsed**

### September 2018

**SEP<sup>17-18</sup> - WORKSHOP ON VISCERAL TRAUMA (DEFINITIVE SURGICAL TRAUMA CARE – DSTCTM)**  
Universitätsklinik Graz - Department of Surgery, Auenbruggerplatz 29, 8036 Graz, Austria  
Event Type: **Endorsed**

### October 2018

**OCT<sup>23-26</sup> - DKOU 2018**  
Messe Berlin, Jafféstraße, 14055 Berlin  
Event Type: **Endorsed**



## **2-nd Annual Albanian Congress of Trauma and Emergency Surgery 2018**

**Tetovo, Macedonia, 8-10 November 2018**

**ALBANIAN SOCIETY OF TRAUMA AND EMERGENCY SURGERY**

