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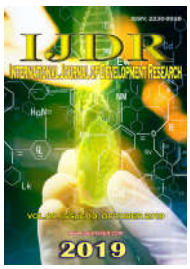

RESEARCH ARTICLE OPEN ACCESS

TRUE OR MYTH? STERNAL FRACTURES AND AORTIC RUPTURE - A TWENTY YEAR STUDY

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ABSTRACT

Aim of the study: To determine the relation between sternal fracture and aortic rupture between Nosocomial and Necrotomic population. **Material and Methods:** It is a two different group study. Patients admitted with sternal fracture (Nosocomial population NOP) and Necrotomic population NEP. It is a twenty year study. The NOP study includes 134 patients with sternal fracture diagnosed and admitted in the department of Thoracic Surgery of Nicaea –Greece, during a twenty year period. The NEP study includes530 sternal fractures registered at Medical Examiners (Forensic) Department of Piraeus – Greece, 376 males and 154 females, age from 1-93 years (m.ag 47,68), during a twenty year period. **Results:** Result Nop study: Noaortic rupture registered. No aortic rupture was found related to sternal fracture. Sternal fracture as an isolated injury has a better prognosis compared to those with associated injuries. The management of sternal fracture is usually conservative with a good outcome, provided early diagnosis and treatment of concomitant injuries is offered from a well-trained and experienced medical team.
Result NEP Study: Sternal fracture is related to aortic rupture. Seventy two cases to 530 demonstrated coexistence sternal fracture and aortic rupture (13,58%). Themaincauseis traffic accidents. High alcohol blood levels was found at 153 to 530 cases (28,87%). The male population 133/153(86,93%), The male population (376) outnumber to female (154). **Conclusion**: Sternal fracture absorbs energy at the frontal thoracic wall protecting the great vessels, the heart and the lungs. When the energy is huge the sternal fracture can't absorb all the energy, so aortic rupture takes place and cause death. This means that when see patient with sternal fracture at the hospital likely no aortic rupture will happen. It is more wise to look for associated injuries which increase significant morbidity and mortality.

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INTRODUCTION

Traffic accidents still causehigh morbidity and mortality, also are the main cause for thoracic trauma specially sternal fractures. Sternal fracture absorbs energy at the frontal thoracic wall protecting the great vessels, the heart and the lungs. When the energy is huge the sternal fracture can't absorb all the energy, so aortic rupture takes place and cause death.

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MATERIAL AND METHODS

It is a two different group study. Patients admitted with sternal fracture (Nosocomial population NOP) and Necrotomic population NEP. It is a twenty year study.

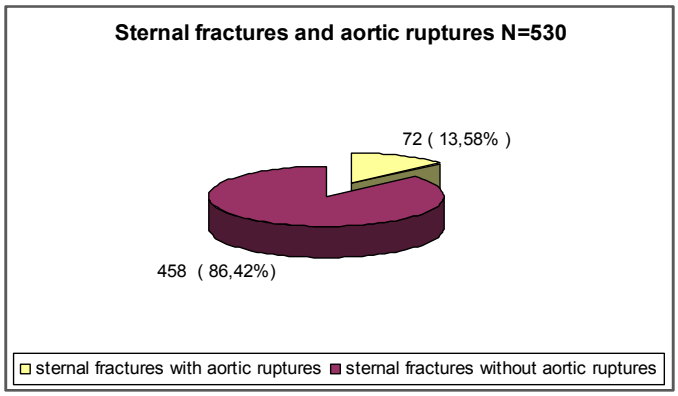
The NOP study includes: 134 patients with sternal fracture diagnosed and admitted in the department of Thoracic Surgery of Nicaea –Greece, during a twenty year period.

The NEP study includes: 530 sternal fractures registered at Medical Examiners (Forensic) Department of Piraeus –Greece,

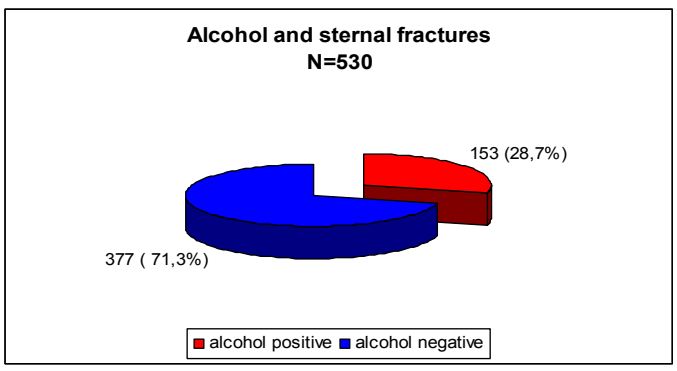
during a twenty year period, 376 males and 154 females, age from 1-93 years (m.ag 47,68).

RESULTS

The NOP study: In a twenty year period 134 patients with sternal fracture diagnosed and treated in our hospital, 59 male and 45 female, between the ages of 17 and 84, mean aged 54.93 ± 15.12 years old (Mean ± SD). Ninety (67%) patients diagnosed with single lesion - sternal fracture and 44 (33%) suffered by sternal fracture associated with multiple injuries. Patients diagnosed with single lesion – sternal fracture were 90 (60 male, 29 female), between the ages of 27 and 84. Hospitalisation stay was 2 to 8 days, with an average of 3.14 ± 1.28 (Mean ± SD). Patients suffered by sternal fracture associated with multiple injuries were 44 (33 male, 11 female), between the ages of 17 and 80. Hospitalisation stay was 10 to 39 days, with a higher average of 9.44 ± 6.89 (Mean ± SD), which is of statistic importance of p=0.02, compared to that of patients suffering from single lesion sternal fracture. Diagnosis was based on clinical examination, anamnesis, combined with the history of the injury. All patients underwent chest radiography and specially the lateral one. Tests for cardiac enzymes, such astroponin, CK (creatine-kinase), CK-MB (creatine-kinase MB), LDH (lactic dehydrogenase), were conducted on all patients and repeated accordingly depending on the results. The computer tomography CT improve the diagnosis, especially when dilatation of the mediastinal shadow, hemodynamic instability. Echocardiogram, underwent almost all patients and ECG monitoring for at least 48 hours.



Picture 1. Sternal fractures and aortic ruptures



Picture 2. Alcohol blood levels

The NEP study: Seventy two cases to 530 demonstrated co existence sternal fracture to aortic rupture (13, 58%). The main causes seem to betraffic accidents 80, 38%, falls 16, 76% and workers accidents 2, 86%. High alcohol blood levels was found at 153 to 530 cases (28, 87%).The male population 133/153(86, 93%), outnumber to female20/153(13, 07%).

DISCUSSION

It is known that sternal fracture absorbs energy who takes place at the frontal thoracic wall protecting the great vessels, the heart and the lungs. When the energy is huge the sternal fracture cannot absorb all the energy, so aortic rupture takes place causal of sudden (almost) death. Athanassiadi *et al.* (2002) supported the absence of aortic rupture on her study. Metaxas *et al.* (2006) have demonstrated in a previous study the absence of aortic rupture in nosocomial population too.Special attention should be given to associated injuries who can increase the morbidity and mortality (Metaxas *et al.,* 2006). Clinical examination, anamnesis is always the golden standard for the diagnosis. Radiography for the chest special the lateral one can improve the diagnosis, but the value of the computer tomography (Metaxas *et al.,* 2014; Hugget *et al.,* 1998; Naidich, 1994) is unremarkable, because can demonstrate the existence of pneumothorax, haemothorax, lung contusion, rib, scapula and vertebras fractures (Metaxas *et al.,* 2014), specially in mediastinal shadow and patient haemodynamic instability. Special attention should be given to cardiac contusion and arrhythmias (Lindstaedt *et al.,* 2002; Muwanga *et al.,* 1989). Blood tests like troponin – cardiac enzymes and Echo for the heart need to be done in every patient (Lllig *et al.,* 1991; Brooks *et al.,* 1992). Patients need ECG monitoring (Lllig *et al.,* 1991) for at least 48 hours during their admission. Seventy twocasesto530 (necrotomic material – 20 years) demonstrated coexistence sternal fracture to aortic rupture(13,58%).This means that sternal fracture is strictly related to aortic rupture (Metaxas *et al.,* 2014). The cause of the sternal fracture and its complication seem to betraffic accidents 80,38%, falls 16,76% and workers accidents 2,86%. Traffic accidents still cause high morbidity and mortality andstill remain a huge problem to drivers, to society, to many countries (LoCicero *et al.,* 1989). Many factors can affect traffic accidents like the rules (legislation) of every country, drivers behaviour-religion, quality of the roads, alcohol's consumption. Wang *et al.* (2003) demonstrated that the main cause of morbidity and mortality of trauma in China are human factors accounting more than 90%. Alcohol's consumption in China is relative slow 0,29-1,48% to 50% in United States of America. In China about 70% of road traffic accidents were related to bicycles. Wong *et al.* (2002) demonstrated that drivers' alcohol consumption in Singapore was 18,7% and 82,3% were mail. Sternal fracture is strictly related to aortic rupture.The main cause of the sternal fracture and its complication are the traffic accidents.(80,38%) and the high levels of alcohol in blood (28,87%) (Aleksandar *et al.,* 1999; Michael *et al.,* 2000).

Conclusion

Traffic accidents still cause high morbidity and mortality, also are the main cause for thoracic trauma specially sternal fractures. Sternal fracture absorbs energy at the frontal thoracic wall protecting the great vessels, the heart and the lungs. When the energy is huge the sternal fracture can't absorb all the energy, so aortic rupture takes place and cause death. This means that when see patient with sternal fracture at the hospital likely no aortic rupture will happen. It is more wise to look for associated injuries which increase significant

morbidity and mortality. Special attention should be given to aortic contusion ct scan is required with contrast.

REFERENCES

Aleksandar V. Milovanovic, Vincent JM. Di Maio, 1999. Death Due to Concussion and Alcohol. *American Journal of Forensic Medicine & Pathology,* 20(1):6-9.

Athanassiadi K, Gerazounis M, Moustardas M, Metaxas E. 2002. Sternal fractures: retrospective analysis of 100 cases. *World J Surg.,* 26(10):1243- 6.Epub 2002 Aug 16.

Brooks SW, Young JC, Cmoli KB. *et al.* 1992. The use of transeosophagealechocardiographyin the evaluation of chest trauma. *J Trauma.,* 32: 761-5.

E.K.Metaxas, D.Tsakri, G. 2014. Athanasas. Sternal fractures and aortic rupture. A twenty year necrotomic material Surgical Chronicles Vol.19, Issue 2.

Efstathios K. Metaxas, Nicolas Condilis, Nicolas Tzatzadakis, Athanasios Dervisoglou, Michael I. Gerazounis, George Athanasas, 2006. Sternal fracture with or without associated injuries. Assessment of the difference in the diagnosis and complications. Eighteen years of experience. Annali Italiani di Chirurgia, 77:379-383

Hugget JM, Roszler MH. 1998. CT Findings of sternal fracture. *Injury.,* 29(8): 623 - 6.

Lindstaedt M, Germing A, Lawo T. *et al.* 2002. Acute and Long-term clinical significance of myocardial contusion following blunt thoracic trauma: Results of a prospective study. *J Trauma.,* 52(3):479-85.

Lllig KA, Swierzewski MJ, Feliciano DV *et al.* 1991. A rational screening and treatment stategy based on the electrocardiogram alone for suspected cardiac contusion. *Am J Surg.,* 162(6):537-43.

LoCiceroJ III,Mattox KL. 1989. Epidemiology of chest trauma. *Surg Clin North Am.,* 69:15-19.

Metaxas E.K., M.P. Moustardas, M.I. Gerazounis, 2014. Rib Fractures: Retrospective Analysis of 1428 Cases. Surgical Chronicles Vol.19, Issue 1.

Michael J. Shkrum, David A. 2000. Ramsey. Death Due to Concussion and Alcohol. *American Journal of Forensic Medicine & Pathology,* 21(1):94.

Muwanga CL. Cole RP, Sloan JP. *et al.* 1986. Cardiac contusion in patients wearing seat belts. *Injury.,* 17(l):37-9.

Naidich DP. 1994. Helical computed tomography of the thorax. Clinical applications. *Radio! Clin North Am.,* 32(4): 759-74.

Wang Z, Jiang J. 2003. An overview of research advances in road traffic trauma in China. *Traffic Inj Prev.,* 4(1):9-16.

Wong E, Leong MK, Anantharaman V, Raman L, Wee KP, Chao TC. 2002. Road traffic accident mortality in Singapore. *J Emerg Med.,* 22(2):139-46.

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