

Effect of Neck Collar on Pulmonary Function in Multiple Trauma Patients

Farzad Rahmani^{1*}, Hassan Soleimanpour² and Hanieh Ebrahimi Bakhtavar¹

¹Department of Emergency Medicine, Tabriz University of Medical Sciences, Daneshgah Street, Tabriz 51664, Iran

²Road Traffic Injury Research Center, Tabriz University of Medical Sciences, Daneshgah Street, Tabriz 51664, Iran

*Corresponding author: Farzad Rahmani, Assistant professor, Department of Emergency medicine, Tabriz University of Medical Sciences, Daneshgah Street, Tabriz 51664, Iran, Tel: 984113352078; E-mail: Rahmanif@tbzmed.ac.ir

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Editorial

Accidents and traumas on the one hand can lead to physical and psychological harm and on the other hand can lead to destruction of capital and economic losses. Deaths from traffic injuries accounted the highest rate of deaths due to unintentional injuries in the world. Traumas caused by car accidents annually kill about 1.2 million people and more than 50 million are injured or disabled due to these traumas. Damage caused by the severe trauma can be minimized by rapid onset of treatment and taking care of trauma patient. Most deaths caused by trauma usually occur in the period before reaching the hospital or in the early hours after the injury [1]. According to The World Health Organization estimation, mortality and injury caused by vehicles in 2020 will be increased to 67% in the Middle East, North Africa and Asia and a daily average of 23 people in the world will die [2].

Spine injuries involve 4.8% of injuries and the halves of them are cervical spine injuries. Car accidents are the leading cause of these injuries and after that falling from heights, injuries caused by gunshot and sports injuries are the other causes of the injuries [3]. Criteria of pre-hospital spinal immobilization have been transformed with the development of emergency medical systems. Academy of Orthopaedic Surgeons Committee of America emphasize on the symptoms of potential damages of spinal cord [4]. Evaluation of the cervical spine should be done in simultaneously with airway control and the neck collar should be fastened for all patients [5]. According to ATLS guidelines, for each multi trauma patient neck collar should be fastened in the primary survey, simultaneously with checking of the airway and subsequent imaging studies of the cervical spine injury should be done at a later stage [6].

Spirometry or checking the pulmonary performance is an important tool to check the status of the lung and lung-related diseases. Four important factors that will be examined in spirometry are FVC, FEV1, FEF25-75 and FEV1/FVC which are impressed in pulmonary or musculoskeletal diseases and they are used to diagnose [7,8]. External factors that affect breathing can interfere with these assays. For example, using backpack, based on weight and feeling pressure on shoulders and back can interfere with pulmonary function tests and cause shortness of breath [9].

It seems that most patients with cervical collar complain of shortness of breath and have a desire to open it. Several different studies have done about the impact of using neck collar in trauma patients on the pulmonary function tests. The results of these studies shows that using neck collar and spine stabilization in multiple trauma patients with normal lung function, leads to a significant reduction in lung volumes, particularly FVC, FEV1 and FEF25-75 [10-12]. In one of the studies Kendrick Extrication Device [KED] was referred to as the

main cause of dyspnea and oxygen desaturation in patients [10]. The rate of change in pulmonary function tests after using neck collar was as bellow: FVC decreased by 3.6%, FEV1 decreased by 4.3% and FEF25-75 decreased by 8.4% [13]. In another study, the overall change is reported 15% [12].

Considering the mentioned studies, it seems that ventilation monitoring, especially in multiple trauma patients with cervical collar is necessary. According to previous content using cervical collar in traumatic patients, it has been found to lead to impaired pulmonary function tests. So it is likely that using cervical collar has an adverse impact on the ventilation of trauma patients. This adverse effect may affect mortality and morbidity in patients.

One of the most important tools available to control the ventilation of patients is the use of Capnography. The mechanism of Capnography is determination of end-tidal carbon dioxide partial pressure [ETCO₂]; because it is closely related to the partial pressure of carbon dioxide in arterial blood. Using Capnography ventilation problems of patients can be realized and should be taken immediately in order to eliminate it [13]. Capnography can be used in trauma patients using cervical collar to accurately monitor the status of the ventilation of patients. We recommend that further studies should be done to investigate this situation and the results can help us to monitor ventilation of trauma patients with cervical collar much better.

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