Research Article

iMedPub Journals
http://www.imedpub.com

Trauma & Acute Care
ISSN 2476-2105

2020
Vol. 4 No.2:74

DOI: 10.36648.2476-2105.5.1.77

Characterization of Patients with Carotid Artery Trauma in a 4th Level Hospital in a Ten Years Period

Azifquintero Quintero*, Rolando Medina Rojas[1], Wilmer Fernando Botache[1], Justo German Olaya[2], Yesid Quintero Perez[3]

[1]Surgeon, Trauma and Emergency surgeon, Colombia; [2]Cirujano, Breast Surgeon, Colombia; [3]Resident, Colombia

***Corresponding author:** Azifquintero Quintero, Surgeon Trauma and Emergency surgeon, Colombia, E-mail: azifquintero1983@gmail.com

Citation: Quintero A (2020) Characterization of Patients with Carotid Artery Trauma in a 4th Level Hospital in a Ten Years Period. Trauma Acute Care Vol.5 No.1: 3 DOI: 10.36648.2476-2105.5.1.77

Abstract

Carotid trauma is a well-known entity with severe morbidity and high rates of mortality. Due to its low frequency of appearance an interdisciplinary effort is needed to get at diagnosis. We reviewed 946 clinical histories with a diagnosis of cervical trauma, cervical fracture, vascular trauma of the neck and craniofacial trauma looking for Denver´s risk factors for carotid trauma in a 10 years period in a 4th level Colombian hospital. Overall, 36 patients where found, most of them Young men. The most frequent trauma mechanism was violence-related, no blunt carotid trauma was diagnosed in this study, none received stroke prophylactic treatment, although no stroke was reported. Our study describes a population of patients with open cervical trauma despite the inclusion of blunt vascular trauma criteria showing that there is a lack in the approach and treatment of these patients in the emergency room. Actually, we are aiming for a complete treatment guide that leads us bring optimal diagnosis and treatment.

Keywords: Carotid Trauma; Cervical trauma; Stroke

Received: February 25, 2020; **Accepted:** March 26, 2020; **Published:** April 2, 2020

Introduction

In the spectrum of traumatic entities, cervical trauma is one of the less common ranging from 1 to 2.6% of all blunt traumas. Skull base fractures, cervical, facial and spinal fractures in addition to chest trauma have been identified as associated risk factors for cervical injuries [6]. Approximately 1% of patients with major trauma have cerebrovascular trauma, this lesions are more common in patients with severity scores for trauma higher than 16 points and those who require more than 24 hours in hospital [9].

Carotid blunt trauma becomes important in suspicion and early diagnosis due to his association with high rates of ischemic stroke (60%), severe neurological sequelae and high mortality (19-43%), these patients are asymptomatic initially in 66-73% and may have stroke symptoms even 31 days after the trauma event [1-3]. Denver an Memphis diagnostic criteria for carotid trauma where evaluated in a 2012 study published in Jama, over a 14 years period between 1997 and 2010 showing that patients with specific trauma mechanism where asymptomatic and of them 20% weren't identified using actual tamisation test [7,8].

Preston Miller and cols in 2002, showed that no invasive diagnostic test like angiotomography or cervical magnetic resonance aren't accurate enough as screening test for carotid blunt trauma using a efficiency evaluation comparing with angiography [11,12].

Internal carotid artery trauma has been associated with poor prognosis and requires early management. Improvements in diagnostic images have lead to a prompt diagnosis and better outcomes, there is a growing consensus about the early use of antithrombotic therapy. Most of these interventions include endovascular procedures. Although long-term follow-up studies are lacking, these treatment techniques have demonstrated safety and efficacy in reducing neurological complications in both internal and external carotid trauma.

Despite the consensus about the need for antithrombotic or antiplatelet preventive therapy for stroke after carotid trauma, there is not a generally accepted management guide on this topic. The objective of this work is to describe our population and outcomes for patients with carotid trauma admitted to the emergency room of a single 4 level Hospital in Colombia.

For this purpose, a descriptive retrospective study was designed

on a single cohort corresponding to the population over 13 years old admitted to the emergency room of the Hernando Moncaleano Perdomo Hospital from Neiva, with cervical and carotid trauma in 10 years, between January 2007 and August 2017. Once the database was reviewed using the manual of diagnostic codes of the International Classification of Diseases in its edition 10 (ICD10), 946 patients were collected, after the analysis, 36 patients were identified.

The average age was 29 years, with male prevalence with 33 of 36 patients (91.6%). None of the patients admitted into the study had previously known cardiovascular disease, diabetes mellitus, high blood pressure or chronic kidney disease. Six patients of 36 (16.6%) had previous hospitalizations due to the use of psychotropic drugs.

The most frequent mechanism of trauma was stab wounds with [19,5] of 36 patients (54.3%), followed by gunshot wounds (34.3%), motorcycle accidents as drivers (5.7%) and two wounds caused by fragmentation grenades (5.7%) Table 1.

Table 1: Trauma mechanism

	n [%]
Gun Shot	12 [34.3]
Stab wounds	19 [54.3]
Transit	2 [5.7]
Other	2 [5.7]
VITAL SIGNS	
Sistolic blood pressure	67 [52-78]
Diastolic blood pressure	110 [90-130]
Respiratory rate	20" [18-25]
Heart rate	91" [80-115]

Vital signs at admission recorded show systolic arterial tensions average 110mm Hg with narrow ranges of presentation that vary from 90-130 mm Hg, diastolic blood pressure was presented on average with a value of 63 mm Hg, with variations ranging from 52-78 mm Hg.

Other vital variables such as heart rate and respiratory rate were found in average values of 91 beats per minute and 20 breaths per minute with values ranging from 80-115 beats and 16-25 breaths per minute respectively. None had a Glasgow coma scale below 15/15. None of 36 patients required transfusions.

According to anatomical neck areas, traumatic wounds occurred more frequently in zone II (63%), followed by zone I (26.6%) and finally zone III (10%), predominant right laterality (60%) Figure 1.

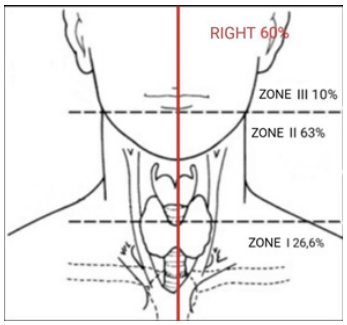

Figure 1: Wound locations.

Injuries associated with penetrating trauma were found in 21 patients. Upper airway injury was the most common, present in 11 patients of 21 (52%), followed by lung lesions (28.5%), esophagus and brachial plexus (9.5%). AIS (Abbreviated Injury Scale) evaluation showed that severe AIS 4 lesions were found in 13 of 36 patients (36.1%), AIS 3 was found in 22.2%, AIS 5 in 27.7%, AIS 2 lesions only 8.33%, no lesions described as AIS 1 or AIS 6 were found. Observed mortality was 5.7%.

About Denver criteria for carotid artery trauma, we found that the most frequently described finding was the presence of expansive hematoma in 12 of 36 patients (34.3%), followed by cervical hematoma (26.6%), pulsatile bleeding (22.7%), cervical fracture (5.7%), craniofacial fracture le Fort II-III (2.9%) and hanging trauma (2.9%). 55.5% had none of the Denver criteria, 8.33% had 4 criteria, 13.8% had 3 criteria, 5.5% 2 criteria and 19.4% had 1 criteria.

Once patients were admitted to the emergency room, 72.2% went for cervical exploration surgery, 27.7% (10 patients) received medical follow-up. Of these 10 patients [4] did not require any type of surgical intervention, [3] required delayed surgery after imaging studies. None required reintervention.

About imaging studies, 7 chest radiographs (20%) were obtainded, right pneumothorax was found in 57.1%, left pneumothorax in 14.2 and bilateral pneumothorax in 14.2%. Right hemothorax in 42.8%, left hemothorax and bilateral in 14.2%. Vessel Neck ultrasound was performed in 5 of 36 patients (13.8%), 80% were reported as normal. Cervical angiotomography was performed in 8 patients (22.2%), with abnormal findings in 7 patients (87.5%). No arteriography was performed, neither endovascular management was needed for any of them.

In-hospital management was divided for this study into three areas: emergency room, hospitalization, and Intensive Care Unit obtaining the following results. Only 11.1% remained in the emergency room and observation for more than one day, with an average stay of 2.7 days each. 63.8% remained as inpatient for more than one day, with an average hospitalization time of 9.2 days. 10 patients (27.7%) required treatment in ICU with an average hospitalization time of 5 days [21]. Regarding antithrombotic or antiplatelet therapy, we found that only 16.6% received prophylactic antithrombotic therapy related to a long hospital stay in ICU. No stroke was identified in this study population [14-16].

Discussion

Cervical blunt trauma is a low-frequency finding in the emergency room, being 1 to 2.6% of all blunt trauma, our experience for this injury rate is 3.8%. Clinical awareness of possible internal carotid artery injury and early diagnosis become important because it is associated with high rates of ischemic stroke (60%) and severe neurological sequelae and mortality (19-43%). Complications can be significantly reduced with appropriate diagnosis and early treatment [1,2,3,10].

Internal carotid artery injuries have a poor prognosis and require

adecuate treatment. There is a growing consensus about the need for early use of antithrombotic therapy. Fusco and Harrigan in 2011 found that Denver criteria were useful to define the need for cerebrovascular imaging studies in 4.8% of a total of 249 patients, of which 18% had internal carotid blunt trauma.

The presence of one criterion predicted the presence of a carotid lesion in 33-48% of patients, two criteria increase the probability of about 56-74%, three criteria 80-88% and all criteria 93%. Our study, when applying the same criteria, we found that 19.4% of the patients had more than 3 positive criteria for carotid artery blunt trauma, 5.5% had 2 criteria and 19.4% had only one criterion.

However, none underwent arteriography for diagnosis or endovascular management was offered because this diagnosis was not suspected. There is no consensus about medical management with anticoagulation or antiplatelet therapy for stroke prophylaxis. There are multiple non-randomized studies and case reports where the application of systemic anticoagulation improves prognosis in patients with neurological symptoms and prevents stroke in asymptomatic patients [12,13].

Studies report the same effectiveness between systemic heparinization and antiplatelet therapy (clopidogrel or Acetylsalicylic acid) stroke prophylaxis [17-19]. Only 16.6% of our patients received thromboprophylaxis treatment with low molecular weight heparins.

Conclusion

The population that most often enlarges trauma statistics are young males, with trauma mechanisms related to urban violence and conflict. Our hospital receives a great number of patients with trauma mechanisms that determine identifiable risk factors for carotid blunt trauma. This study identified 946 patients with suspicious for cervical blunt trauma and none of them had any vascular imaging studies to rule out carotid blunt trauma. Carotid trauma was made and vascular studies were performed in patients with open neck trauma and cervical vascular injury that required some type of surgical intervention [20,22,23].

Patients had high scores of trauma severity assessment (AIS) with scores equal to or greater than 3 in 86% of patients. These injuries were related to injury to neighboring structures that reach almost 60%. Although more studies with strong evidence and recommendations are needed for antiaggregant or antithrombotic prophylaxis schemes, high morbidity and mortality rate related to blunt and open carotid trauma is a fact, no stroke events were described on this study. Only a few patients received antithrombotic prophylaxis with low molecular weight heparins. A large interdisciplinary effort is required to identify patients with risk factors for carotid blunt trauma.

References

1 Dua A, Desai SS, Kuy S, Patel B, Dua A, Desai PJ, et al. (2012) Predicting Outcomes Using the National Trauma Data Bank: Optimum Management of Traumatic Blunt Carotid and Blunt Thoracic Injury. Perspect Vasc Surg Endovasc Ther. 24: 123-127.

2 Lee TS, Ducic Y, Gordin E, Stroman D. (2014) Management of carotid artery trauma. Craniomaxillofac Trauma Reconstr. 7: 175-189.

3 Tisherman SA. (2016) Management of Major Vascular Injury: Open. Otolaryngol Clin North Am. 49: 809-817.

4 Outhillier A, van Loveren HR, Keller JT. (1996) Segments of the internal carotid artery: a new classification. Neurosurg. 38: 425-432.

5 Moore, Keith L. (2010). Anatomia con orientación clínica. España: Walters Kluwer Health; Lippincott Williams and Wilkins.

6 Galyfos G, Filis K, Sigala F, Sianou A. (2016) Traumatic Carotid Artery Dissection: A Different Entity without Specific Guidelines. Vasc Spec Int. 32: 1-5.

7 McKevitt EC, Kirkpatrick AW, Vertesi L, Granger R, Simons RK. (2002) Blunt vascular neck injuries: diagnosis and outcomes of extra-cranial vessel injury. J Trauma. 53: 472-476.

8 Jones TS, Burlew CC, Kornblith LZ, Biffl WL, Partrick DA, Johnson JL, et al. (2012) Blunt cerebrovascular injuries in the child. Am J Surg. 204: 7-10.

9 Bodanapally UK, Sliker CW. (2016) Imaging of Blunt and Penetrating Craniocervical Arterial Injuries. Semin Roentgenol. 51: 152-64.

10 Wang M, Wu D, Qiu W, Wang W, Zeng Y, Shen Y. (2017) An injury mortality prediction based on the anatomic injury scale. 96: e7945.

11 Biffl WL, Cothren CC, Moore EE, Kozar R, Cocanour C, Davis JW, et al. (2009) Western Trauma Association Critical Decisions in Trauma: Screening for and Treatment of Blunt Cerebrovascular Injuries. J Trauma Inj Infect Crit Care. 67: 1150-1153.

12 Miller PR, Fabian TC, Croce MA, Cagiannos C, Williams JS, Vang M, et al. (2002) Prospective screening for blunt cerebrovascular injuries: analysis of diagnostic modalities and outcomes. Ann Surg. 236: 386-395.

13 Deng Q, Tang B, Xue C, Liu Y, Liu X, Lv Y, et al. (2016) Comparison of the ability to predict mortality between the injury severity score and the new injury severity score: A meta-analysis. Int J Environ Res Public Health. 13: 1-12.

14 Fusco MR, Harrigan MR. (2011) Cerebrovascular dissections: A review. Part II: Blunt cerebrovascular injury. Neurosurg. 68: 517-530.

15 Jones TS, Burlew CC, Kornblith LZ, Biffl WL, Partrick DA, Johnson JL, et al. (2012) Blunt cerebrovascular injuries in the child. Am J Surg. 204: 7-10.

16 Dua A, Desai SS, Kuy S, Patel B, Dua A, Desai PJ, et al. (2012) Predicting Outcomes Using the National Trauma Data Bank: Optimum Management of Traumatic Blunt Carotid and Blunt Thoracic Injury. Perspect Vasc Surg Endovasc Ther. 24: 123-127.

17 Biffl WL, Ray CE, Moore EE, Franciose RJ, Aly S, Heyrosa MG, et al. (2002) Treatment-related outcomes from blunt cerebrovascular injuries: importance of routine follow-up arteriography. Ann Surg. 235: 699-707.

18 Vilke GM, Chan TC. (2011) Evaluation and management for

carotid dissection in patients presenting after choking or strangulation. J Emerg Med. 40: 355-358.

19 Burlew CC, Biffl WL. (2010) Blunt cerebrovascular trauma. Curr Opin Crit Care. 16: 587-595.

20 Lyrer P, Engelter S. (2003) Antithrombotic drugs for carotid artery dissection. Library (Lond).

21 Dahlin BC, Waldau B. (2016) Surgical and Nonsurgical Treatment of Vascular Skull Base Trauma. J Neurol Surg. 77: 396-403.

22 Wagenaar A, Burlew C, Biffl WL, Beauchamp KM, Pieracci FM, Stovall RT, et al. (2014) Early repeat imaging is not warranted for high-grade blunt cerebrovascular injuries. J Trauma Acute Care Surg. 77: 540-545.

23 Ziyal IM, Ozgen T, Sekhar LN, Ozcan OE, Cekirge S. (2005) Proposed classification of segments of the internal carotid artery: anatomical study with angiographical interpretation. Neurol Med Chir. 45: 184-191.