

Vascular Traumatism of Limbs in Civil Practice in Dakar

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ABSTRACT

Introduction: Vascular limb trauma refers to any traumatic lesion involving a blood vessel; an artery or vein; located in the limbs, caused by laceration, contusion, section, crush, puncture or other mechanisms. They constitute a medico-surgical emergency that involves both vital and functional prognosis.

Material and methods: We conducted a retrospective and descriptive study on the vascular trauma of the limbs in civilian practice supported in the department of Thoracic and Cardiovascular Surgery of the National University Hospital of Fann at Dakar. The study period is 7 years, from September 2010 to August 2017.

Results: The number of patients was 107 with a sex ratio of 7.92. The average age of the population was 27.8 years [5 months-82 years]. The brawls and aggressions with the domestic accidents were the most represented etiological contexts with a frequency of 38.3% and 21.5% respectively. Vascular lesions by glass breakage (40.2%) and stabbing (32.71%) were mostly represented. Eighty-seven traumas affected the upper limb (81.3%) and the lower limb (18.7%). Arterial lesions was present in 97 patients (90.6%) while venous lesions was present in 48 patients (44.8%). The most affected arteries were the radial artery (33.6%), the ulnar artery (27.1%) and the brachial artery (16.8%). Sixty-five patients (60.7%) were received within 6 hours and another 24 (22.4%) after 6 hours. The main reason for consultation or hospitalization was the occurrence of externalized bleeding in 86% of cases. The immediate or distant occurrence of swelling traumatism is also a reason in 13.1% of cases. Signs of hypovolemic shock were found in 15 patients (14%). Seventy-one patients (66.4%) presented another lesions as nerve damage in 46 patients (43%), musculotendinous lesions in 64 cases (59.8%). Arterial and venous Doppler ultrasonography was performed in 5 patients (4.67%).

Computer Tomodensitometry angiography was performed in 7 patients (6.54%). The management was medico-surgical. The types of procedure performed in our series in order of frequency are: 59 sutures per termino-terminal anastomosis (55.1%), 17 single lateral sutures (15.9%), 12 venous interpositions (11.2%), 9 arterial ligations (8.4%), 3 venous patch suturent (2.8%). Venous repair was performed in 46 cases (42.9%). It consisted of 28 ligations against 25 sutures, one by venous interposition. The immediate postoperative course was favorable in 86 patients (80.4%). The other 21 patients had complications such as neurological disorders (10.3%), infectious syndrome (8.4%), early thrombosis (2.8%), compartment syndrome (2.8%), a revascularization syndrome with electrolyte disorders (1.9%) and acute renal failure (0.9%). Six patients underwent reintervention (3 aponevrotomy, one leg amputation, femoro-popliteal bypass). Early mortality was 2 cases. Neurological sequelae such as paresthesia and paralysis were observed in 15% of cases.

Keywords

Vascular limb trauma, civilian practice, Senegal.

Introduction

Vascular limb traumatism refers to any traumatic lesion involving

a blood vessel (artery or vein) located in the limbs caused by laceration, contusion, section, crush, puncture or other mechanisms [1]. They constitute medical-surgical emergencies that can put the vital and functional prognosis at risk. It is the third leading cause of death in the world [2]. In civilian practice, they account for 0.2% to 4% of all traumatic injuries [3]. An aim of the study is to describe the epidemiological, clinical, paraclinical, therapeutic and evolutionary aspects of vascular traumatism of the limbs in the department of Thoracic and Cardiovascular Surgery of the National University Hospital of Fann.

Materials and methods

We conducted a retrospective and descriptive study on the vascular traumatism of the limbs in civilian practice supported in the department of Thoracic and Cardiovascular Surgery of Fann at Dakar. The study period is 7 years (September 2010 to August 2017). Included in this study were all patients who had surgery for limb traumatism in civilian practice with an archived record in the department of Thoracic and Cardiovascular Surgery of the National University Hospital of Fann. Patients with traumatic limb wounds with no notion of vascular injury, patients treated for vascular traumatism in military practice, and unexploitable cases were not included in the study. The data collected was analyzed with Sphinx Plus 2 software.

Results

The total population was 107 patients. Of these 107 patients, 88.8% were male and 11.2% female (sex ratio 7.92). The average age was 27.8 years [5 months-82 years]. In our series, 28% exercised a profession considered at risk (glazing, shoes repair, butchering, mechanics, carpentry). The brawls and aggressions with the domestic accidents were the most represented etiological contexts with a frequency of 38.3% and 21.5% respectively. Subsequently, work accidents (19 cases or 17.8%), road accidents (8 cases or 7.5%), recreational activities (4 cases or 3.7%). In our study, glass vascular lesions (40.2%) and stab vascular lesions (32.71%) were predominantly represented. The lesions are 81.3% in the upper limb and 18.7% in the lower limb. Arterial lesions were present in 97 patients (90.6%) while venous lesions were present in 48 patients (44.8%). The lesions involved radial artery in 33.6%, ulnar artery in 27.1% and brachial artery in 16.8%. The radial and basilic veins were the most affected with respectively 21, 7% and 18.3%. The majority of lesions observed were in the form of a complete section of the vessel (69.2%). Lateral wounds and false aneurysms followed with respectively 19.6% and 11.2%. Arterial or venous contusions accounted for 5.6% of the lesions while arteriovenous fistulas were observed in 1.9% of the cases. Sixty-five patients (60.7%) were received within 6 hours and 24 others (22.4%) after 6 hours.

The main reason for consultation or hospitalization was the occurrence of externalized bleeding (86%). The immediate or distant occurrence of swelling traumatism is also a reason in 13.1% of cases. Signs of hypovolemic shock were found in 15 patients (14%). Hemorrhage was the most observed physical sign in 80 patients (71%). Twelve patients (9.3%) had a compressive

hematoma. Ischemic signs have also been observed. Motor disorders were observed in 30 patients (28%). Seventy-one patients (66.4%) had mixed lesions (associated nerve lesion in 46 patients or 43%, musculotendinous lesions in 64 cases or 59.8%). Arterial and venous Doppler ultrasonography was performed in 5 patients (4.67%). CT angiography was performed in 7 patients (6.54%). Ninety-four patients (87.9%) underwent provisional haemostasis (compression in 74.8%, garrotte in 23.4%, suture in 11.2%, direct clamping or ligation in 2.8%). The management was medico-surgical. The arterial repair consisted of 59 cases (55.1%) in a termino-terminal anastomosis, in 17 cases (15.9%) in a lateral suture, in 12 cases (11.2%) in a venous interposition, in 9 cases (8.4%) in an arterial ligation and in 3 cases (2.8%) in a repair with a venous enlargement patch. On the venous side, 28 ligations against 25 sutures, one of them by venous interposition were performed. Only one patient underwent osteosynthesis. Repair of the nerve lesions was essentially done by direct suturing with epiperineural points. The tendon lesions were repaired by Kessler points reinforced by hemisurjects.

Discharge aponevrotomy was performed in the leg of a patient for compartment syndrome. In our study, apart from osteosynthesis, which was performed in only one case, 37 patients (34.6%) benefited from wearing plaster splints in order to stabilize the limb. These patients, for the most part, had vascular lesions in the articulations. Fifteen of our patients (14%) underwent preoperative transfusion, indicated by hemorrhagic shock. Postoperatively, 5 patients (4.6%) were also transfused in the presence of severe anemia. The immediate postoperative course was favorable in 86 patients (80.4%). The other 21 patients had complications such as neurological disorders (10.3%), infectious syndrome (8.4%), early thrombosis (2.8%), compartment syndrome (2.8%), a revascularization syndrome (1.9%) and acute renal failure (0.9%). Six patients underwent a reintervention: three aponevrotomies secondary to the occurrence of a compartment syndrome, an amputation for ischemic gangrene, a femoro-popliteal graft by venous graft after failure of the revascularization following a suture by termino-terminal anastomosis and thrombectomy following early thrombosis after bypass with placement of a new graft. Early mortality was 2 cases. Long-term outcome was favorable in 24.3% of patients without sequelae. On the other hand, neurological sequelae such as paresthesia, paralysis or deformity were observed in 15% of cases.

Discussion

In our series, we noted a clear male predominance with a sex ratio of 7.92. The preponderance of male subjects is very common in traumatic pathology [4-8]. This predominance can be attributed to the higher level of activity or mobility of the male gender that exposes them to various traumatisms. The average age found in our population was 27.8 years old. This was the case in most series in the literature [9-12,8]. The high prevalence of limb traumatism in young subjects as found in several studies is probably due to the fact that individuals in this age group are the most active. In our study, work-related injuries represented the third vector of limb traumatism (17.8%). We identified certain profession that we

defined as being at risk professions (butchery, carpentry, laborer, glazier). In our series, 28% had a risk profession. In the study by Lakhwani et al [13], although work-related accidents were not the main etiological factor, manual workers were the most represented. It is the same with the study of Salimi and Zarei [14]. This could be explained by the lack of protection and safety in the practice of these professions in our regions. The brawls and aggressions represent the first etiological factor of our series as in that carried out by M. Ndiaye with a rate of 45,1% [8]. This predominance of brawls and aggression can be attributed to increased insecurity and interpersonal violence as observed in some studies [15,16]. Indeed, the development of urbanization implies an increase of the populations of the cities thus favoring promiscuity and a certain urban poverty. In our series, wounds by firearms account for 2.8% of cases, unlike other series [17,12,18]. In our series, road accidents, unlike Ndiaye series (21.56%) [8].

Represent 7.5% of cases. According to Fokou, the low accident rate of the public road would probably be related to the fact that vascular wounds are quickly fatal at the scene of accidents, especially in a context of multiple trauma and where initial care is still underdeveloped [7]. Razmadze [9] report an incidence of 30.6%. The functional prognosis of the traumatized limb is directly correlated with the delay in management, as well as the patient's vital prognosis. Most series have shown that the main cause of limb loss is delayed diagnosis and treatment of vascular limb traumatism, especially when combined with ischemia. In the latter case, a delay of more than 6 hours is a sign of poor prognosis [19]. In our study, most patients were treated in less than 6 hours (60.7%), as in the Ndiaye series, where 84.62% of patients were treated in a shorter period of time less than 12 hours, 50% of them before the 6th hour [8]. These results can be explained by the fact that the majority of the patients followed resided in Dakar. In our study, the number of vascular lesions recorded in the upper limbs was significantly higher than that of the lower limb lesions (81.3% vs 18.7%) as in most series [20-23]. In our series, hemorrhage was the main reason for consultation. Obvious sign of a serious traumatism, it brings the patients or the entourage to consult as quickly as possible.

Our results are similar on those found in the literature [8,7,24]. This suggests that closed injuries would be important but not addressed in a specialized setting because of the diagnostic difficulties posed by certain clinical forms [25,26]. It is in these cases that the use of imaging is important as was the case in our study where a false aneurysm was found in 11.2% of cases and an arteriovenous fistula in 1.9%. Hussain et al [17] reported a rate of 7.8% false aneurysms; they did not observe any cases of arteriovenous fistulas. Nwafor et al [27] in their series obtained a rate of 30% false aneurysms and 3.8% arteriovenous fistulas. The results of our study show that the majority of patients in care had a complete section as a type of vascular injury (69.2%). These results join those of the literature [28-30].

During our study, all patients received surgical treatment. For more than half of the cases (55.1%), terminoterminal anastomosis

sutures were the most frequently encountered. Meek and Robbs [31] advocate that if the loss of substance is greater than 5 mm an interposition graft should be used. The primary amputation rate in our study was nil. The immediate evolution was favorable with a rescue rate of nearly 80.4% of cases as in most series [9,28]. The post-operative complications were marked in 3 cases (2.8%) by a compartment syndrome which is also rather rare [7,13,27,32,33,14] probably because of the realization of discharge aponevrotomy in a prophylactic manner. Three cases of revascularization syndrome (2.8%) were noted. In the series of Ndiaye [8] and Prichayudh [29], the revascularization syndrome was observed in similar proportions with respectively 3.9% and 3.8%. Yangni-Angate et al. [11] obtained a result identical to ours with a rate of 2.8%. In our study, no patient had amputation as a primary surgical treatment like Orcutt [34] and Myers's [35] series. The study by Bhargava et al [36] showed a primary amputation rate of 24.1%, Eren's study [37] 27%, Thomas's study [38] 9.8% and that of Nwafor et al [27] a rate of 7.7%. Secondary amputation was performed in a patient with ischemic gangrene of the leg. In our series, we found 2 deaths (1.9%). In international series, Razmadze [9] reports a rate of 7.6%, Sciaretta [39] a rate of 8.5% and Ranna [32] a rate of 4%.

Conclusion

In civilian practice, limb traumatism is considered rare. When they occur, these traumatism are in most cases localized to the limbs. The resulting vascular lesions come in various forms and the etiological circumstances are variable. The vascular traumatism of the limbs are real medical-surgical emergencies. They represent a real threat to the functional prognosis of the injured limb and the patient's vital prognosis, hence the need for rapid and effective management. In sub-Saharan Africa, and in Senegal in particular, few studies have been done on this type of traumatism. This work was undertaken to describe the epidemiological, clinical, paraclinical, therapeutic and evolutionary aspects of vascular limb traumatism.

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