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Orthopedics-Traumatology

Surgical Activities of Orthopedics-Traumatology in a Second Reference Hospital in Mali Over a Period of Six Months

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Abstract **Original Research Article**

The aim of this study was to determine the frequency and nature of Orthopedic-Traumatology surgical procedures, to identify the main pathologies encountered and to analyze the characteristics of patients in a second-reference hospital in Mali. This was a retrospective descriptive study lasting six months from March 1 to August 31, 2023. Included in this study all the usable files of patients regardless of their age, sex, profession admitted to the department for an orthopedic or trauma pathology whose management required surgery. Two hundred and fifty-one (251) surgical procedures were selected, i.e. 20.9% of all surgical procedures in the hospital. A male predominance was found with a sex ratio of 2.4. The age group of 21 to 40 years was the most affected by operable lesions of the musculoskeletal system. The predominant socio-professional class was represented by farmers and breeders. Treatment before hospital admission was traditional in 55.2% of cases. The injuries were traumatic in 69.7% of cases. The pelvic limb was the most common location (68.6%) with a predominance of the leg segment (29.5%). The most common pathologies were fractures and soft tissue wounds. Patients were operated on in emergency in 168 cases (66.8%). Osteosynthesis, debridements and amputations were the most frequent surgical procedures. Orthopedic and trauma surgery represents an important part of the surgery at the Sominé Dolo Hospital in Mopti; one of the second reference hospitals located in the center of the country.

Keywords: Surgical Activities, Orthopedics-Traumatology, Second Reference Hospital in Mali.

INTRODUCTION

Diseases of the musculoskeletal system are common pathologies. According to the WHO, about 1.7 billion people are affected. These conditions are the leading factor of disability in the world [1]. Their care is multidisciplinary. Orthopedic and trauma surgery occupies an important place. Hundreds of thousands of surgical procedures are performed each year around the world [2]. However, in developing countries such as Mali, this specialty is facing multiple difficulties. Health facilities, especially those located in peripheral regions, face many challenges in providing quality care due to limited human and material resources, unfavourable socio-economic conditions of the population, and difficulties in accessing health structures. The Mopti hospital, despite being a second-reference establishment in Mali, plays a key role in the management of musculoskeletal disorders in a region often affected by the security crisis that the country has been going through for more than a decade.

The purpose of this study was to determine the frequency and nature of Orthopedic-Traumatology surgical procedures performed, to identify the main pathologies encountered and to analyze the characteristics of patients in a second-reference hospital in Mali (Mopti).

METHODOLOGY

The study took place at the Sominé Dolo Hospital in Mopti, in the Surgery department, which includes all the surgical specialties of the hospital. The department had 53 hospital beds spread over 16 rooms of different categories. The Orthopedics-Traumatology team at the time of the study had three surgeons. The hospital had an operating theatre with two functional rooms, one for clean surgery. This was a descriptive,

retrospective study lasting six-month duration from March 1 to August 31, 2023, inclusively. Included in this study were all usable files of patients regardless of their age, sex, profession admitted to the department for an orthopedic or trauma pathology whose management required surgery. Incomplete files, files of patients not operated on in the department and patients discharged against medical advice were not included. Similarly, minor surgical procedures (skin grafts, delayed or secondary primary sutures), revision surgeries, and patients who received nonoperative treatment were not considered in this study.

We have carried out an exhaustive recruitment of all the files of patients admitted to the department for an orthopedic or trauma pathology while respecting our inclusion criteria. The data were collected from medical records and the operative report register. These data were collected on a pre-established individual survey sheet incorporated into IBM SPSS Statistic version 25 software, specifying sociodemographic, injury and therapeutic data. The lesions were traumatic, infectious, tumoral, or degenerative. Patients were operated on urgently or according to the operating program (Tuesday). The data were analyzed by IBM SPSS Statistic version 25 software. We calculated proportions for qualitative variables; the mean, standard deviation, and extremes for quantitative variables. The results were presented in the form of tables and figures.

This study was conducted in accordance with the protocol of good clinical practice and the principles of the Declaration of Helsinki. The confidentiality and anonymity of the patients were respected.

RESULTS

During the study period, 1250 surgeries were performed at the Sominé Dolo Hospital in Mopti. Two hundred and fifty-one (251) concerned orthopedic or trauma pathology, i.e. 20.1%. These procedures were performed in 240 patients. They were 171 men (71.2%) and 69 women (28.8%), i.e. a sex ratio of 2.4. The average age was 37.7 +/- 20.9 years with extremes of 4 and 90 years. The age group of 21 to 40 years was the most affected by surgical injuries of the musculoskeletal system. The predominant socio-professional class was represented by farmers and breeders (Table I). The month of April saw the highest number of interventions (Figure 1).

Table I: Sociodemographic characteristics of patients

Characteristics	Number	Percentage
Sex		
Male	171	71,2
Female	69	28,8
Age range		
Under 20 years of age	61	25,4
21 – 40 years	89	37,1
41 – 60 years	47	19,6
Over 60 years	43	17,9
Profession		
Student	20	08,3
Farmer/Breeder	68	28,3
Military	32	13,3
Housewife	39	16,3
Elderly/Retired	41	17,1
Merchant	17	07,1
Others*	23	09,6
Total	**240**	**100**

Other*=07 children, 08 civil servants, 05 fishermen, 03 drivers.

Treatment before hospital admission was traditional in 55.2% of cases. The lesions were traumatic (69.7%) or non-traumatic (infectious, tumoral or degenerative) in 30.3% of cases (Table). Ballistic trauma (firearms and improvised explosive devices) was the predominant etiology (33.8%) followed by public road accidents (28.3%) (Figure 2). The pelvic limb was the most common location with 68.6% of lesions. The leg was the most affected segment with 29.5%. The forearm was the most affected segment of the upper limb with 11.0% of cases. The most common pathologies were fractures (open or closed) and soft tissue wounds (Table II).

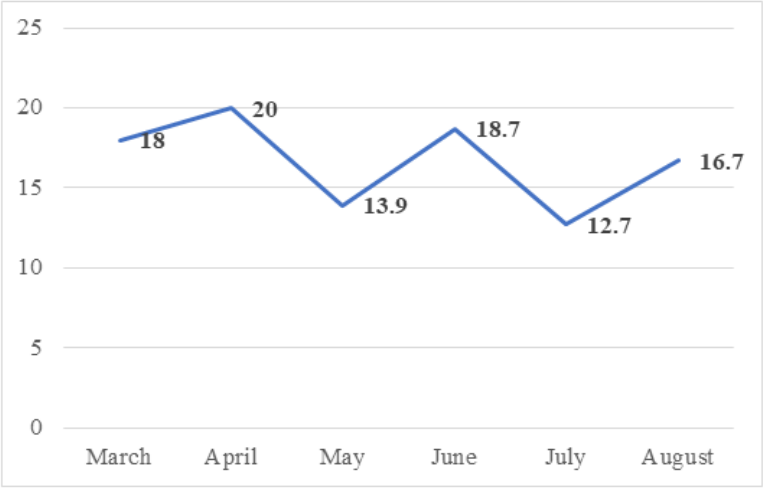

Figure 1: Distribution of interventions by month

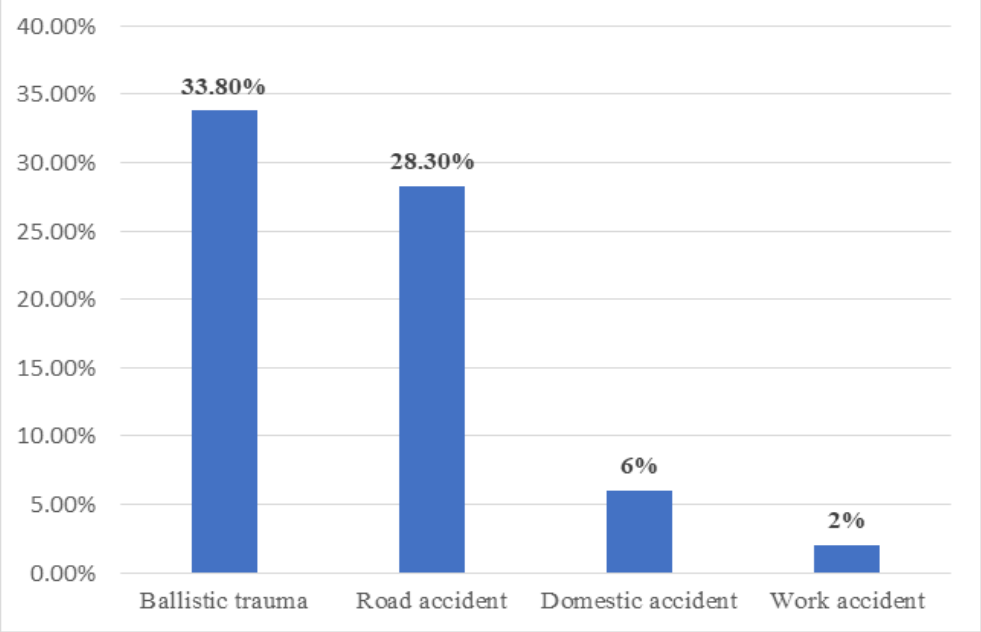

Figure 2: Distribution of pathologies by etiology

Table II: Distribution by pathology

Pathologies	Number	Percentage
Closed fracture (recent or old)	54	21,5
Open fracture	37	14,7
Soft tissue wound	46	18,3
Non-traumatic ischemia/gangrene	32	12,7
Post-traumatic ischemia/gangrene*	27	10,8
Infection (osteomyelitis, septic arthritis, myositis, necrotizing fasceitis, etc.)	25	10,0
Tumor	14	05,6
Desire for ablation of osteosynthesis material	05	02,0
Dislocation	04	01,6
Knee axis defect (genu-valgum)	03	01,2
Coxarthrosis/osteonecrosis femoral head	02	00,8
Compartment syndrome	02	00,8
Total	251	100,0

*: Gangrene after traditional trauma treatment, threshing machine grinding, mine foot, traumatic amputation.

Table II: Distribution of lesions by site

	Traumatic pathology				Non-Traumatic pathology					Total
	Fracture	Wound of soft parts	Ischemia / gangrène post-traumatic	Others*	Infection	Knee axis defect	Coxarthrosis / ONFH	Gangrene / diabetic	Tumor	
Thoracic member										
Shoulder	03	06	--	--	--	--	--	--	02	**11**
Arm	10	05	--	--	03	--	--	--	--	**18**
Elbow	04	--	--	04	--	--	--	--	--	**08**
Forearm	06	02	07	01	--	--	--	--	01	**17**
Poignet/Main	10	02	04	--	05	--	--	04	02	**27**
Pelvic member										
Pelvis/hip	07	08	--	--	--	--	02	--	--	**17**
Thigh	14	17	02	02	04	--	--	--	03	**42**
Knee	14	00	--	--	04	03	--	--	--	**21**
Leg	16	06	10	04	06	--	--	12	04	**58**
Ankle/Foot	07	--	04	--	03	--	--	16	02	**32**
Total	91	46	27	11	25	03	02	32	14	251

Other*=04 inveterate elbow dislocations, 02 compartment syndromes (leg and forearm) and 5 desires for removal of osteosynthesis material (3leg and 2Thigh).

Patients were operated on urgently in 168 cases (66.8%) or according to the operative program in 83 cases (33.2%). The anaesthesia techniques used were, in order of frequency, spinal anaesthesia (123 cases), peripheral nerve blocks (92 cases), general anaesthesia (22 cases) and a combination of techniques (14 cases). Osteosynthesis, debridements and amputations were the most frequent surgical procedures (Table III).

Table III: Distribution by type of surgical procedure

Type of intervention	Number	Percentage
Osteosynthesis +/- debridement	83	36,2
Debridement	73	24,8
Amputation	63	23,8
Biopsie +/- excision	10	04,8
Arthroplasty	07	03,3
Desire for removal of osteosynthesis material	05	02,4
Bloody Dislocation Reduction	04	01,9
Correction osteotomy	03	01,4
Fasciotomy	02	00,9
Arthrodesis	01	00,5
Total	**251**	**100,0**

The implants used are summarized in Table IV. Other additional surgical procedures were practiced, including thin skin grafts, delayed secondary sutures, and coverage of soft tissue loss by flaps (5 gastrocnemius, 5 soleus, one supramalleolar and one sural with proximal pedicle).

Table IV: Type of implant used

Implant Type	Number	Percentage
Screwed plate	33	14,8
K-wire fixation	20	8,6
Centromedullary nailing	18	7,1
External Fixator	14	6,7
Total hip prosthesis	5	2,4
Partial hip prosthesis	2	0,9
95° angled blade plate	3	1,4
Tension band wiring	2	0,9
Screwdriving	01	0,5
Total	**98**	**43,3**

DISCUSSION

This study was carried out at the Sominé Dolo Hospital in Mopti, one of the second-reference hospitals in the Mali health pyramid whose mission is to provide second-reference curative care and the management of medical-surgical emergencies.

During the six-month study period, 251 surgical procedures were performed to manage the pathologies of the musculoskeletal system, i.e. 20.1% of all surgical procedures. In Guinea, A Barry *et al*., [3] reported 594 interventions over a period of seven years and six months. This frequency could be explained by the fact that the Mopti hospital is the only second-reference medical-surgical structure in the region that receives the wounded from all over the center of the country. A predominance of the young adult male population was found. This finding has been reported by several African studies [3-6, 7]. This predominance could be explained by the fact that this fringe of the population is more active and therefore more exposed to various traumas. Socio-professional activity was dominated by farmers and breeders (28.3%). This same observation was made by Kouassi A A N *et al*., [8] in 30.7%. However, Kouassi KJE *et al*., [5] and Yao LB *et al*., [4] found a predominance of students and staff of direct services to individuals, traders and vendors, respectively. These variations reflect regional differences in the occupational activities of populations. Agriculture, livestock and fishing remain the main occupations of the population of the Mopti region [9].

In Mali, particularly in Mopti, traditional medicine is closely linked to the socio-cultural universe and deeply rooted in the habits of society [6]. It is therefore solicited in first line before any affection. This is a common practice without a scientific basis and is the cause of many complications [6, 8, 10]. Patients consult only after having exhausted other therapeutic resources (traditional treatment) have been exhausted [11]. More than half of the patients in this study (55.2%) used traditional treatment.

The frequency of traumatic pathology is highly reported [3-5]. In this study, the majority of injuries were also traumatic (69.7%). These were mainly fractures and soft tissue wounds. Ballistic trauma (33.8%) and road accidents (28.3%) were the predominant etiologies. The frequency of injuries by firearms and explosive devices could be related to the security crisis in central Mali, one of the main regions of which is Mopti (study site). Public road accidents are known to be the main providers of musculoskeletal injuries [3-5, 12]. The frequency of pelvic limb injuries in this study is also found in the literature [3-6, 13]. The pelvic limbs were devoid of any protection and received shocks directly during accidents. The most affected segment was the leg. This is for anatomical and biomechanical reasons. This study also reports the frequency of surgical emergencies in orthopedics-traumatology in 66.8%.

The most common surgical procedures were osteosynthesis, debridement, and amputations. Osteosynthesis was practicede in 36.2%. The diversity of indications for the screwed plate compared to other implants would explain its frequency. The technical platform only allowed for femoral and tibial centromedullary nailing. K-wire, in addition to its indications, was less expensive and easily accessible, often allowing its use out of necessity than in principle. Total hip arthroplasty used in only 5 cases was an expensive surgery not accessible to a esource-limited population. Debridement was the surgical act of management of ballistic lesions and infections. Amputations were frequent. They were practiced for the treatment of post-traumatic gangrene, diabetic gangrene and wounds and tumors. Several authors report the same indications for major amputations [3, 4, 6, 8, 14]. The high rate of amputation is related to the practice of traditional treatment. This method of treatment was responsible for the delay in consultation and the occurrence of complications (gangrene), making amputation the only therapeutic option at the time of treatment. Additional surgical procedures were necessary. Coverage of soft tissue loss per flap (12 cases), skin grafts and deferred secondary sutures.

This study is limited by its retrospective, monocentric nature and its short period (6 months). She also mentions the need for multicentric and forward-looking work.

CONCLUSION

This study noted a frequency of orthopedic and trauma surgical activities. Traumatic pathologies were predominant due to assaults by firearms and accidents on public roads. Major surgical procedures were dominated by osteosynthesis, debridement and amputation. Orthopedic and trauma surgery represents an important part of the surgery at the Sominé Dolo Hospital in Mopti; one of the second reference hospitals located in the center of the country.

Conflict of Interest: None

Contribution of our study to knowledge: In Mali, none had yet been made on the importance of surgical activities in Orthopedics-Traumatology despite the increasing number of admission. This study allowed us to show that the most frequently operated lesions concerned the lower limbs. The most common type of surgical procedures were osteosynthesis, debridement and amputations.

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