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Abdominal Trauma in Cameroonian Inmates: Patterns and Results of Management in Three Prison Medical Units

Traumatismes abdominaux chez les prisonniers camerounais : typologie et prise en charge dans trois centres médicaux pénitenciers

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ABSTRACT

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Background. Abdominal trauma occupies an important place within traumatic injuries in prison. No study has been conducted to date on this topic in our country. We aimed to determine the typology of abdominal trauma in Cameroonian inmates and to assess the results of their management in penitentiary hospitals. **Methods.** This study was conducted in the medical unit of the three biggest Cameroonian penitentiary institutions. Retrospectively, we collected data on inmates admitted for the management of abdominal trauma from November 1st, 2019 to October 30, 2020. **Results.** We recorded 66 patients with a mean age of 29.45 years; the sex ratio was of 12.2/1 in favour of males. Patients were mainly pre-trial inmates (81.3%, n=54). Abdominal trauma occurred after fight/assault by another detainee in all cases. Forty-three patients (65.1%) had blunt abdominal trauma and 23 (34.9%) abdominal stab wound. On admission, 14 (32.5%) patients with blunt abdominal trauma presented with hemodynamic instability. Stab wounds were penetrating in 17 cases (73.9%) and associated with an evisceration in 5 patients. Fifty-five (83.33%) of patients were totally managed in penitentiary health units, with 4 deaths recorded (7.3%). The mortality rate was higher in patients with stab wounds (21.4%) compared to that of patients with blunt traumas (2.5%). No death was recorded among the eleven patients who were transferred to community hospitals. **Conclusion.** Abdominal traumas are uncommon among Cameroonian inmates. The mortality is high and more important among patients with abdominal injuries. The penitentiary health system needs to be improved to reduce these outcomes.

RÉSUMÉ

Introduction. Les traumatismes abdominaux font partie des traumatismes les plus fréquents en prison. Aucune étude n'a été menée à ce jour sur ce sujet dans notre pays. Notre objectif était de déterminer la typologie des traumatismes abdominaux chez les détenus camerounais et d'évaluer les résultats de leur prise en charge dans les centres médicaux pénitenciers. **Materiels et méthodes.** Cette étude a été menée dans les centres médicaux des trois plus grands établissements pénitentiaires camerounais. Rétrospectivement, nous avons collecté des données sur les détenus admis pour prise en charge de traumatismes abdominaux du 1er novembre 2019 au 30 octobre 2020.

Résultats. Nous avons enregistré 66 patients avec un âge moyen de 29,45 ans ; le sexe ratio était de 12,2/1 en faveur des hommes. Les patients étaient principalement des prévenus (81,3 %, n=54). Le traumatisme abdominal s'était produit après une bagarre/une agression par un autre détenu dans tous les cas. Quarante-trois patients (65,1 %) avaient une contusion abdominale et 23 (34,9 %) une plaie de l'abdomen. A l'admission, 14 (32,5%) patients présentant une contusion abdominale avaient une instabilité hémodynamique. Les plaies abdominales étaient pénétrantes dans 17 cas (73,9%) et associées à une éviction chez 5 patients. Cinquante-cinq (83,33%) des patients ont été totalement pris en charge dans les unités de santé pénitentiaires, avec 4 décès enregistrés (7,3%). Le taux de mortalité était plus élevé chez les patients avec des plaies abdominales (21,4%) par rapport à celui des patients avec des contusions (2,5%). Aucun décès n'a été enregistré parmi les onze patients qui ont été transférés dans les hôpitaux communautaires. **Conclusion.** Les traumatismes abdominaux sont relativement rares chez les prisonniers camerounais. La mortalité liée à ces traumatismes est élevée et plus importante en cas de plaie abdominale. Le système de santé pénitentiaire devrait être amélioré pour réduire ces résultats.

INTRODUCTION

Despite measures taken to ensure safety among inmates, injury due to violence are common, even in maximum security prison units ; violence remains a major problem in prisons with a higher incidence than in the general population [1,2]. The prevalence of accident-related injuries and the one of violence-related injuries are 2.3 and 14 times higher among prison inmates than community residents, respectively [3]. This can be explained by the profile of the prisoners; one in two people is imprisoned for an offense committed with violence [4] and one in four inmates is violent at least once during their imprisonment [5].

Abdominal trauma occupies an important place within traumatic injuries in prison. in fact, exploratory laparotomy is the most often performed procedure after trauma in prison [6]. Even if prisoners have the right to high quality health care like any other individual, there is a qualitative difference between the care administered in penitentiary hospitals and those in community hospitals [7].

In Africa, few studies are available on abdominal trauma in prison [8,9]. In Cameroon particularly, prison overcrowding is significant [10], dedicated health centres are under-equipped [11] and none study have been conducted on trauma in jails. Thus justify this study which aimed to determine, in our country, the typology of abdominal trauma in prisoners and to assess the results of their treatment in penitentiary hospitals.

METHODS

This study was conducted in the medical unit of the three biggest cameroonian penitentiary institutions (sub-Saharan Africa) : The Central Prison of Yaoundé, The Central prison of Douala and the Central prison of Maroua. These three prisons have a total of around 9,300 detainees, while their normal capacity is one-fifth of this number. None of these three penitentiary hospitals has surgeons or emergency physician in its medical staff, but two to three general practitioners assisted by nurses.

Data were retrospectively collected on the medical records of inmates admitted for the management of abdominal trauma from November 1st, 2019 to October 30, 2020. Demographic information, type of abdominal trauma, traumatic mechanism, management and outcomes were collected. Approval was obtained from the national penitentiary administration and from the ethics comitee of the faculty of medicine and biomedical sciences of the University of Yaoundé I.

RESULTS

During the study period, 2 521 detainees consulted in penitentiary medical unit among whom 66 (2.6%) for abdominal trauma, constituting our study population. Their mean age was 29.45 years (range, 18-41 years). Male were predominant (n=61, 92.4%) with a sex ratio of 12.2/1. Pretrial inmates represented 81.3% (n=54) of prisoners and the mean reason for incarceration was lack of identity card (n=16, 24.2%). Demographic and judiciary profile of inmates are listed in Table1.

Abdominal trauma was reported as intentional in all cases, occurring after fight/assault by another detainee; it was often caused by punches or kicks (n=43, 65.1%) and knife (n=9, 13.6%). Forty-three patients (65.1%) had blunt abdominal trauma and 23 (34.9%) abdominal injuries. No gunshot wound was recorded, all the injuries being stab wounds. Table 2 summarizes patients' abdominal trauma patterns.

Table 1: Demographic and judiciary profile of inmates

Age (range)	18-41 years
Age (Mean)	29.45 years
Sex	
▪ Male	61 (92.4%)
▪ Female	5 (6,6%)
Psychiatric History	0
Type of inmates	
▪ Pretrial	54 (81.3%)
▪ Convicted	12 (17,7%)
Reason for incarceration	
▪ Lack of identity card	16 (24,2)
▪ Simple theft	15 (22.7%)
▪ Drug use	10 (15.1%)
▪ Terrorism	6 (9.1%)
▪ Aggravated theft	5 (7.6%)
▪ Blows and wounds	4 (6.1%)
▪ Fraud	4 (6.1%)
▪ Breach of trust	3 (4.5%)
▪ Murder	3 (4.5%)

Management of patients with blunt abdominal trauma (n=43)

Among the patients who had an abdominal contusion, 14 (32.5%) were admitted with hemodynamic instability and none with signs of peritonitis. The abdominal trauma was isolated in all cases. The initial resuscitation measures were successful among 12 of these patients. The two patients (4.6%) who were still in hemodynamic instability were transferred to community hospitals and operated on arrival with uneventful postoperative course. The other 41 patients (95.4%) were treated in the penitentiary hospital on a conservatory basis. An abdominal ultrasound was performed in 14 (34.1%) of them. A hemoperitoneum was found in all cases and an etiology advocated in only 4 cases; it was a splenic lesion. No abdominal scan was performed. The outcome was satisfactory in 40 patients (97.5%) with an average hospital stay of 6 days (range, 4-9 days). However, one case of death (2.5%) was noted. This was a patient with a conservatively treated splenic lesion who presented two days after admission with hemorrhagic shock.

Management of patients with abdominal injuries (n=23)

The wound was single in 16 cases (69.8%), penetrating in 17 cases (73.9%) and most often located in the peri-umbilical region (n=9, 39.1%). On admission, no hemodynamic instability was recorded. Five patients (21.7%) presented with an evisceration and 4 (17.4%) with signs of peritonitis. These 9 patients (39.1%) were transferred to community hospitals where all of them were operated without any postoperative complications nor death recorded. The remaining 14 patients were managed

in penitentiary medical center with wound care and antibiotics. Three of them (21.4%) died within 72 hours of admission, with signs of acute generalized peritonitis.

Overall Outcome

Fifty-five (83.33%) of patients were totally managed in penitentiary health facilities, with 4 deaths recorded (7.3%). No death was recorded among the eleven patients who were transferred to community hospitals.

Table 2: Abdominal trauma patterns and typology

item	n	%
Type of abdominal trauma		
▪ Blunt Abdominal trauma	43	65.1
▪ Abdominal injury	23	34.9
Circumstances of occurrence		
▪ Fight or assault by another detainee	66	100
▪ Accident	0	0
▪ Self-inflicted	0	0
Instrument used to inflict the trauma		
▪ Punches or kicks	43	65,1
▪ Knife	9	13,6
▪ Razor blade	5	7,6
▪ Carved wood	5	7,6
▪ Piece of glass	3	4,5
▪ Toothbrush	1	1,5
Patients with blunt abdominal trauma		
▪ Hemodynamic instability	14	32.5
▪ Stable	29	67.5
▪ Signs of peritonitis	0	0
Patients with abdominal injury		
▪ Penetrating injury	17	73.9
▪ Non penetrating injury	6	26.1
▪ Single wound	16	69.8
▪ Extra-abdominal injury	0	0
▪ Signs of peritonitis	4	17.4
▪ evisceration	5	21.7

DISCUSSION

To the best of our knowledge, this study is the first in our country on abdominal trauma in Jails. Despite a significant overcrowding, abdominal trauma represented only 2.6% of the admissions of detainees in dedicated health units; a little more than one admission per week is due to abdominal trauma in Cameroonian prison's health center. A previous African study reported 15 cases in one year [8].

Our series is characterized by an absence of non-violent mechanism and self-inflicted injuries. Indeed, trauma in prison is self-inflicted in 8 to 21.24% [10,11] and accidental in 21.5 to 23.5% [3,12]. Brawls, with punches or kicks, between prisoners therefore constitute the main etiology of abdominal trauma in this report. The use of

knives seems less important than in other penitentiary studies [6,10,11], where cold steel and rudimentary weapons are frequently encountered in such cases. Drug abuse assaults were non-existent in our series but accounted for 56.6% of assaults in the New York City Department of Corrections [12]; drug trafficking remains underdeveloped in our context and the gang phenomenon still marginal. It is not surprising to find that most of these patients were pretrial detainees, when we know the slowness of the Cameroonian judicial system [13].

The results of the management of abdominal trauma in our study are marked by a significant mortality of the order of 7.3%, reaching 21.4% in the group of patients with abdominal injuries. In Western penitentiary series, the death rate varies between 0 and 1.1% [11,12]. If the initial management of patients in our study seems satisfactory (with a rapid transfer of patients with an indication for emergency surgery to community health units), we believe that it's the follow-up of patients in whom a conservative treatment has been decided that needs improvement. Indeed, a patient under surveillance for a splenic lesion died of hemorrhagic shock two days after admission. Likewise, 3 patients followed for abdominal wounds considered as "simples" died with signs of peritoneal irritation. It's known that non operative treatment in abdominal trauma is safe and effective in well selected patients [14-17], but this approach need a close monitoring with close clinical observation, biological and imaging follow-up. One possible explanation of this high mortality could be found in the limited staff (in quantity and in adequate qualifications) in penitentiary hospitals. An effort must be made by the public authorities to offer a good quality care to detainees as well as to the general population. Multidisciplinary care team, adequate technical platform and streamlined administrative procedures for transferring detainees to community hospitals are proposed solutions.

CONCLUSION

Abdominal traumas are quite uncommon among Cameroonian inmates despite a significant overcrowding. It's more often a blunt abdominal trauma after an assault by another detainee with punches and kicks. The mortality is high and more important among patients with abdominal injuries. The penitentiary health system needs to be improved to reduce these outcomes.

Competing Interest

None

REFERENCES

- 1- Green L, Hutchinson C, Lamb D, Johnson D, Wilcox K. Injury surveillance in correctional facilities-Michigan, April 1994-Marh 1995. Morbidity and mortality weekly report 1996;45:69-72.
- 2- Thorburn KM. Injury monitoring in U.S. prison systems. Journal of the American Medical Association 1999;282:430-431.
- 3- Sung HE. Prevalence and risk factors of violence-related and accident-related injuries among state prisoners. Journal of correctional Health care 2010 ;16(3) :178-187.

- 4- Lacambre M, Courtet P. Violence et prison. *La Lettre du Psychiatre*. 2012;8(5):124-7.
- 5- Endrass J, Rosseger A, Urbaniok F, Laubacher A, Vettel S. Predicting violent infractions in a swiss state penitentiary : a replication study of the PCL-R in a population of sex and violent offenders. *BMC psychiatry* 2008;8:74.
- 6- Bragg WD, Hoover EL, Turner EA, Nelson-Knuckles B, Weaver WL. Profile of trauma due to violence in a statewide prison population. *Southern Medical Journal* 1992;85(4):365-369.
- 7- Condon L, hek G, Harris FY. A review of prison health and its implications for primary care nursing in England and wales : the research evidence. *Journal of clinical nursing* 2007 ;1201-1209.
- 8- Youssef N. Surgical digestive emergencies in prisoners, about a prospective study. *J Emerg Trauma Shock*. 2014;7(1):59-61.
- 9- Smit SJA, Kleinhans F. Surgical practice in a maximum security prison – unique and perplexing problems. *S Afr Med J*. 2010;100(4):243-246.
- 10- Ludwig A, Cohen L, Parsons A, Venters H. Injury surveillance in New York City Jails. *Am J Public Health* 2012;102(6):1108-1111.
- 11- O'Connor HM, Stringer DG. Review of traumatic injuries in regional federal penitentiaries. *Can Med Assoc J* 1985;133:204-205.
- 12- Henning J, Frangos S, Simon R, Pachter L, Bholat OS. Patterns of traumatic injury in New York City prisoners requiring hospital admission. *J Correct Health Care* 2015;21(1):53-58.
- 13- Bilong Nkoh FR. Eloignement de la justice de ses réalités locales et crise d'effectivité des normes de procédure pénale au Cameroun. *RIDC* 2017;69(1):211-230.
- 14- Okuş A, Sevinç B, Ay S, Arslan K, Karahan Ö, Eryılmaz MA. Conservative management of abdominal injuries. *Ulus Cerrahi Derg* 2013;29(4):153-157.
- 15- van der Wilden GM, Velmahos GC, Emhoff T, Brancato S, Adams C, Georgakis G et al. Successful nonoperative management of the most severe blunt liver injuries: a multicenter study of the research consortium of new England centers for trauma. *Arch Surg* 2012;147:423–428.
- 16- Zafar SN, Rushing A, Haut ER, Kisat MT, Villegas CV, Chi A et al. Outcome of selective non-operative management of penetrating abdominal injuries from the North American National Trauma Database. *Br J Surg* 2012;99:155–164.
- 17- Hope WW, Smith ST, Medieros B, Hughes KM, Kotwall CA, Clancy TV. Non-operative management in penetrating abdominal trauma: is it feasible at a Level II trauma center? *J Emerg Med* 2012;43:190–195.