Original Research

Open Access

Epidemiological profile of abdominal surgical emergencies in adults at the Saint-Louis Regional Hospital (Senegal) between 2021 and 2022: a cross-sectional study

Abdourahmane Ndong[1,2,*], Stael Tiam Moche[2], Lebem Togtoga[1], Mamadou Saïdou Bah[1], Papa Djibril Ndoye[1], Ibrahima Konaté[2], Khadim Niang[1]

[1]*Department of Public Health and Social Medicine, UFR of Health Sciences, Gaston Berger University, Saint-Louis, Senegal*

[2]*General Surgery Department, Saint-Louis hospitalk, Senegal*

ABSTRACT

INTRODUCTION: Abdominal surgical emergencies are relatively common conditions, with a frequency varying between 20 and 22.7%. Understanding their epidemiological profile would help tailor medical interventions to improve access to care and prognosis. The objective of this study is to describe the epidemiological profile of abdominal surgical emergencies in adults at the Regional Hospital Center of Saint-Louis, Senegal.

METHODS: A cross-sectional descriptive study was conducted from June 1, 2021, to May 30, 2022, in the General Surgery Department of the Regional Hospital Center of Saint-Louis, Senegal. It included all patients aged 15 years and above who presented with an acute abdomen (operated or not). The study collected sociodemographic, clinical, paraclinical, and therapeutic data.

RESULTS: During the study period, 1,228 emergencies were received, of which 275 were abdominal surgical emergencies, resulting in an annual hospital incidence of 22.3%. Of these patients, 191 were male and 84 were female, with a male-to-female ratio of 2.3. The mean age was 39.6 years, with a standard deviation of 18.3 (ranging from 15 to 88 years). The majority of patients (80.0%) arrived at the hospital on their own, with the dominant means of transportation being personal vehicles (68.4%). The most common pathologies were appendicular pathologies (25.1%), followed by strangulated hernias (16.7%), peritonitis (16.7%), intestinal obstructions (15.3%), and abdominal traumas (12.7%). The mean waiting time for surgical management was 50.1 hours, ranging from 8 to 72 hours. General anesthesia was the most commonly used method (66.5%), and surgical treatment was the predominant approach (78.2%). The in-hospital mortality rate was 5.8%.

CONCLUSION: The most affected patients were young men, and the most frequent emergency was appendicitis and its complications. Patients are mostly transported to the hospital on their own using personal vehicles. Despite the relatively low in-hospital mortality rate, the conditions for managing abdominal surgical emergencies remain limited.

***Corresponding author:**
Dr Abdourahmane Ndong
Email: abdourahmane.ndong@ugb.edu.sn

Received: February 8, 2024
Accepted: March 13, 2024
Published: March 31, 2024

Cite this article as: Ndong et al. Epidemiological profile of abdominal surgical emergencies in adults at the Saint-Louis Regional Hospital (Senegal) between 2021 and 2022: a cross-sectional study. *Rw. Public Health Bul. 2024. 5 (1): 53-59.* https://dx.doi.org/10.4314/rphb.v5i1.6

 Publisher: Rwanda Health Communication Centre, KG 302st., Kigali-Rwanda. Print ISSN: 2663 - 4651; Online ISSN: 2663 - 4653. **Website:** https://rbc.gov.rw/publichealthbulletin/

INTRODUCTION

Abdominal surgical emergencies are clinical syndromes characterized by "severe, localized, and rapidly onset abdominal pain caused by a variety of disorders, injuries, or diseases, typically requiring emergency surgical interventions"[1,2]. They are relatively common conditions with a frequency varying between 20 and 22.7%[3]. They are associated with significant mortality, mainly due to delays in consultation and administration of treatments [4]. These emergencies affect individuals of all ages and can be caused by different etiologies, among which appendicitis, peritonitis, and intestinal obstruction predominate [5]. A good knowledge of the epidemiological profile of these emergencies would make it possible to adapt medical interventions in order to improve access to care and the prognosis. This would help improve the quality of care for patients, tailor risk assessments, and implement preventive measures based on the causes and types of patients affected. In Senegal, various studies have been conducted to evaluate acute abdomen, revealing a high prevalence among other emergencies (20.8%), with a high mortality rate, particularly for patients aged, reaching 20.7% in certain series [6,7]. The objective of this study was to describe the epidemiological profile of abdominal surgical emergencies in adults within the Regional Hospital Center of Saint-Louis, Senegal.

METHODS

This descriptive cross-sectional study used secondary data from June 1, 2021, to May 30, 2022. All patients received in the General Surgery department of the Regional Hospital Center for an acute abdomen (operated or not), aged at least 15 years, were included in the study. The non-inclusion criteria were abdominal emergencies due to gynecological, obstetrical, urological or vascular causes. Data collection was done on an electronic form developed with SPSS 23 software. The same software was used for the analysis. The parameters studied were: sex, age, waiting time(duration between hospital arrival and administration of surgical or medical treatment), time of admission, means of transport, etiologies, type of treatment, and case fatality rate (dead or alive in hospital). The qualitative variables are described according to their frequencies (absolute and/or relative), and the quantitative variables are in the form of averages with their standard deviation and extremes.

RESULTS

During the study period, 275 files were collected from a total of 1228 patients who came to the emergency department for consultation, representing an annual hospital incidence of 22.3%. All the files collected were able to be studied.

The average age was 39.6 years, with a standard deviation of 18.3. The extremes were 15 years and 88 years. The age group between 15 and 25 years was the most represented, with a number of 80 patients (29.1%). Table 1 shows the distribution of patients by age. Regarding sex, there were 191 men and 84 women.

The most used means of transport to evacuate patients at the Saint-Louis Regional Hospital Center was the personal vehicle in 68.4% (n=188). The other means of transport used were ambulance (14.5%), taxi (13.5%), and fire brigade (3.6%).

The majority of patients were seen between 12 p.m. and 4 p.m., with 17.4%. Table 1 shows the distribution of patients according to time of admission.

Etiologies of Abdominal Surgical Emergencies

The diagnosis of acute appendicitis dominated with a relative frequency of 25.1%. Strangulated hernias and acute generalized peritonitis came in 2nd position with equal frequencies of 16.7%. Bowel obstructions and trauma followed with respective frequencies of 15.3% and 12.7%. Table 1 represents the distribution of patients according to etiology.

The average waiting time for surgical treatment was 50.1 hours, with extremes of 8 and 72 hours.

In our study, 46 patients (16.7%) had not undergone surgery. Among the operated population, the most used anesthetic procedure was general anesthesia (66.5%). Spinal anesthesia was used in 10.2% of cases and local anesthesia in 6.5%.

There were 3 therapeutic methods: surgery in 78.2% (n=215), medical or non-operative treatment in 16.7%, and instrumental treatment in 5.1%.

During hospitalization, 16 patients died, representing a case fatality rate of 5.8%.

Table 1: *Distribution of patients according to gender and age (n=275)*

	Gender				Age												Total	
	Female		Male		[15-25[		[25-35[		[35-45[		[45-55[		[55-65[		[65-88]			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Time of admission																		
[00H-04H[	5	1.8	9	3.3	5	1.8	2	0.7	0	0.0	1	0.4	1	0.4	0	0.0	14	5.1
[04H-08H[	1	0.4	5	1.8	0	0.0	4	1.5	0	0.0	0	0.0	1	0.4	0	0.0	6	2.3
[08H-12H[	11	4.0	27	9.8	10	3.6	7	2.5	8	2.9	3	1.1	7	2.5	3	1.1	38	13.8
[12H-16H[	18	6.5	30	10.9	16	5.8	6	2.2	6	2.2	10	3.6	4	1.5	5	1.8	48	17.4
[16H-20H[	15	5.5	27	9.8	10	3.6	9	3.3	3	1.1	4	1.5	6	2.2	10	3.6	42	15.3
[20H-00H[	9	3.3	34	12.4	15	5.5	6	2.2	8	2.9	1	0.4	7	2.5	6	2.2	43	15.7
Unspecified	26	9.5	58	21.1	18	6.5	19	6.9	15	5.5	12	4.4	11	4.0	9	3.3	84	30.4
Appendicitis																		
Acute appendicitis	9	3.3	44	16	26	9.5	8	2.9	5	1.8	4	1.5	1	0.4	0	0.0	53	19.3
Appendiceal abscess	6	2.2	6	2.2	8	2.9	4	1.5	0	0.0	0	0.0	0	0.0	0	0.0	12	4.4
Appendicular mass	1	0.4	3	1.1	1	0.4	0	0.0	1	0.4	2	0.7	0	0.0	0	0.0	4	1.5
Peritonitis																		
Complicated appendicitis	10	3.6	19	6.9	15	5.5	7	2.5	2	0.7	4	1.5	1	0.4	0	0.0	29	10.5
Ulcer perforation	2	0.7	9	3.3	0	0.0	7	2.5	3	1.1	0	0.0	1	0.4	0	0.0	11	4
Small bowel perforation	2	0.7	1	0.4	0	0.0	1	0.4	1	0.4	0	0.0	1	0.4	0	0.0	3	1.1
Ruptured ovarian abscess	2	0.7	0	0	1	0.4	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	2	0.7
Ruptured liver abscess	0	0	1	0.4	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0	1	0.4
Strangulated hernias																		
Inguinal hernia	2	0.7	21	7.6	1	0.4	3	1.1	1	0.4	6	2.2	7	2.5	5	1.8	23	8.4
Umbilical hernia	3	1.1	6	2.2	0	0.0	1	0.4	1	0.4	1	0.4	2	0.7	4	1.5	9	3.3
Midline hernia	5	1.8	0	0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.7	3	1.1	5	1.8
Scrotal hernia	3	1.1	0	0	0	0.0	1	0.4	0	0.0	0	0.0	1	0.4	1	0.4	3	1.1
Incisional hernia	3	1.1	0	0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.7	1	0.4	3	1.1
Recurrent inguinal hernia	0	0.0	2	0.7	0	0.0	0	0.0	0	0.0	0	0.0	2	0.7	0	0.0	2	0.7
Diaphragmatic hernia	1	0.4	0	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	1	0.4

Continued on the next page.....

Table 1 continued...

Bowel obstruction																	
Sigmoid volvulus	1	0.4	13	4.7	2	0.7	4	1.5	1	0.4	2	0.7	5	1.8	0	0.0	14	5.1
Adhesions	6	2.2	6	2.2	1	0.4	2	0.7	2	0.7	1	0.4	2	0.7	4	1.5	12	4.4
Colon tumor	2	0.7	5	1.8	0	0.0	1	0.4	1	0.4	1	0.4	1	0.4	3	1.1	7	2.5
Functional obstruction	3	1.1	2	0.7	0	0.0	0	0.0	0	0.0	1	0.4	4	1.5	0	0.0	5	1.8
Anal tumor	0	0	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	1	0.4
Small bowel tumor	0	0	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	0	0.0	1	0.4
Rectal tumor	0	0	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	1	0.4
Intussusception	1	0.4	0	0	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0	1	0.4
Abdominal trauma																		
Blunt	5	1.8	20	7.3	9	3.3	7	2.5	8	2.9	0	0.0	0	0.0	1	0.4	25	9.1
Penetrating	0	0	10	3.6	7	2.5	2	0.7	0	0.0	1	0.4	0	0.0	0	0.0	10	3.6
Others																		
Liver abscess	5	1.8	9	3.3	4	1.5	2	0.7	1	0.4	4	1.5	2	0.7	1	0.4	14	5.1
Non-specific abdominal pain	4	1.5	6	2.2	4	1.5	0	0.0	0	0.0	2	0.7	2	0.7	2	0.7	10	3.6
Acute cholecystitis	4	1.5	2	0.7	3	1.1	0	0.0	0	0.0	2	0.7	1	0.4	0	0.0	6	2.2
Acute pancreatitis	2	0.7	3	1.1	0	0.0	0	0.0	2	0.7	1	0.4	1	0.4	1	0.4	5	1.8
Acute cholangitis	2	0.7	0	0	0	0.0	0	0.0	1	0.4	0	0.0	1	0.4	0	0.0	2	0.7

DISCUSSION

Abdominal surgical emergency is a frequent reason for consultation and admission, representing 20.8% of emergency consultations in some previous Senegalese studies [6]. Many authors agree that acute abdomen surgery represents the majority of the visceral surgeon's activity in Africa [5,8,9]. During our study period, there were 1228 emergency department consultations, including 275 abdominal surgical emergencies (22.3%). These data are lower than those of Attipou in Lomé, who found that surgical emergencies constituted 54.2% of all hospitalized emergencies [10]. These differences are due to the fact that the inclusion criteria vary depending on the study.

In our series, the patients were relatively young, with an average age of 39.6 years. Indeed, this can be explained by the fact that the etiologies of these emergencies more often affect young adults (appendicitis and its complications) (15-25 years) [10,11].

The male gender was predominant. The most frequent emergencies in men were acute appendicitis, colonic volvulus, and abdominal trauma. Several other authors in Africa find this same male predominance, including Gaye in Dakar, with a sex ratio of 2.9 [11]. This is explained by the exclusion of obstetric emergencies in these studies and the predominance of abdominal trauma in men. Besides, penetrating traumas were exclusively present in men. This could be explained by the fact that most of these penetrating trauma happened during assaults mainly involving men [12].

During our study, the peak daily admission of patients was between 12 p.m. and 4 p.m., with 17.4%. The same observation was made in a study in Dakar, where the patient arrival rate increased rapidly from 8 a.m. to a maximum between 12 and 4 p.m. [13].

The means of transport were non-medical (personal vehicle (68.4%) and taxi (13.5%)). In Senegal, the medical transport system, such as the Emergency Medical Assistance Service (SAMU), is not yet included in the population's habits. This system is more used in cases of patient transfer from one structure health to another. It is most often initiated by medical personnel when the patient's condition requires medical supervision. In addition, the geographic coverage of ambulances means that sometimes, the patient's place of residence is closer to medical structures than to the location of the SAMU.

Among the causes of abdominal surgical emergencies, appendicular pathologies represented the most common conditions, with a frequency of 25.1%. These results are more similar to the African series in which appendicitis was the primary cause of acute surgical abdomens [14,15]. However, appendicular pathologies came third or fourth after bowel obstruction, peritonitis, and sometimes strangulated hernias in several other studies [8,11,16]. This could be justified by the fact that for some, appendicular peritonitis was not counted in the number of appendicular pathologies but only in that of peritonitis.

Strangulated hernias occupied an important place in emergency surgical activities. They represented 16.7% of parietal and digestive surgical emergencies. These results are similar to the 16.5% found by El Messaoudi [17]. This high proportion of hernias admitted urgently is due to the lack of resources and the wait-and-see attitude of patients who only consult in cases of strangulation [18].

Peritonitis represented the second most common cause of digestive surgical emergencies and accounted for 16.7%. Gaye found a similar proportion of 25% in Dakar [11]. In Niger, Magagi describes a greater proportion (51.6%) of peritonitis as the cause of digestive surgical emergencies. This difference could be associated with the long surgical treatment times in his study [3].

Occlusions represented 15.3% and were the 4th cause in the study. Sigmoid volvulus represented the leading cause of these obstructions (33.3%), ahead of adhesions (28.6%). Several African authors describe this same predominance [5,19]. This is due to a higher prevalence of colon volvulus in Africa, which is linked to diet and the pelvic colon of Africans, which would be longer [20].

Abdominal trauma was found in 35 patients or 12.7% of all diagnoses encountered. This frequency was comparable to that of Sambo in Benin (10%) [21]and lower than that of El Messaoudi in Senegal (23.2%) [17]. These differences could be due to the non-inclusion of trauma having undergone non-operative treatment in certain studies.

The average waiting time for surgical treatment was 50.1 hours, with extremes of 8 and 72 hours. This long wait would be due to several factors, such as financial constraints and the long time it takes to obtain additional imaging and biological explorations, which are sometimes unavailable. There is also the unavailability of the operating room, given the limited number of operating rooms

compared to needs and the insufficient number of operating room staff [22]. It has been shown by previous studies that a long waiting time can be associated to a higher post-operative complications in abdominal surgical emergencies [23].
In our study, the case fatality rate was 5.8%. A variable rate was found in other African studies (4.9% in Senegal and 12% in Niger) [11,16]. This significant number of deaths could be improved by faster and more appropriate care.

One limitation of our study was a possible selection bias since our study was limited to one hospital in a defined period, limiting the generalizability of the findings. In addition, the study included only patients from a specific region in Senegal. The findings may not fully reflect the diversity of the entire Senegalese population or other populations with different socio-economic and cultural characteristics. The epidemiological profile may differ in other regions or healthcare settings, and the results may not be representative of the broader population. Besides, a longer study period could evaluate the seasonal variations or trends in abdominal surgical emergencies.

CONCLUSION

The most affected patients were young men, and the most frequent emergency was appendicitis and its complications. Patients are mostly transported to the hospital on their own using personal vehicles. Despite the relatively low case fatality rate, the conditions for managing abdominal surgical emergencies remain limited in our context. The long consultation and treatment delays can be significantly improved. Optimizing technical resources and procedures would improve performance.

REFERENCES

[1] Abdomen, Acute - MeSH - NCBI n.d. https://www.ncbi.nlm.nih.gov/mesh/?term=acute+abdomen (accessed November 18, 2022).
[2] Costa G, Fransvea P, Puccioni C, Giovinazzo F, Carannante F, Bianco G, et al. Gastro-intestinal emergency surgery: Evaluation of morbidity and mortality. Protocol of a prospective, multicenter study in Italy for evaluating the burden of abdominal emergency surgery in different age groups. (The GESEMM study). Frontiers in Surgery 2022;9.
[3] Magagi IA, Adamou H, Habou O, Magagi A, Halidou M, Ganiou K. Urgences chirurgicales digestives en Afrique subsaharienne : étude prospective d'une série de 622 patients à l'Hôpital national de Zinder, Niger. Bull Soc Pathol Exot 2017;110:191–7. https://doi.org/10.1007/s13149-016-0499-9.
[4] Rabarijaona M, Rajaobelison T, Ralahy MF, Randriamiarana JM, Rasamoelina N, Riel AM, et al. Facteurs de mortalite par les urgences digestives dans le service de reanimation du CHU de Fianarantsoa Madagascar. Rev anesth-réanim med urgence 2010:10–1.
[5] Harouna Y, Ali L, Seibou A, Abdou I, Gamatie Y. Deux ans de chirurgie digestive d'urgence à l'hôpital national de Niamey (Niger). Médecine d'Afrique Noire 2001:6.
[6] Toure CT, Dieng M. Emergency care in tropical areas: status report based on surgical emergencies in Senegal. Medecine Tropicale: Revue Du Corps de Sante Colonial 2002;62:237–41.
[7] Wade TMM, Ba PA, Diao ML, Diop B, Cisse M, Konaté I. Urgences chirurgicales digestives non traumatiques chez le sujet âgé au CHU Aristide-Le-Dantec de Dakar: à propos d'une série de 110 cas. Journal Africain d'Hépato-Gastroentérologie 2016;10:190–3.
[8] Tendeng JN, Ndong A, Diao ML, Sagna A, Diedhiou M, Dieng M, Manyacka PM, Konate I. Management of digestive surgical emergencies: prospective study of 118 cases. J Afr Chir. 2018;5(2):92.
[9] Zué AS, Josseaume A, Nsafu DN, Galoisy-Guibal L, Carpentier JP. [Surgical emergencies at Libreville hospital center]. Ann Fr Anesth Reanim 2003;22:189–95. https://doi.org/10.1016/s0750-7658(03)00008-x.
[10] Attipou K, Kanassoua K, Sosseh D. Urgences chirurgicales abdominales non traumatiques de l'adulte au Chu Todoin de Lome (Bilan de 5 annees). Journal de La Recherche Scientifique de l'Université de Lomé 2005;7. https://doi.org/10.4314/jrsul.v7i2.47597.
[11] Gaye I, Leye PA, Traoré MM, Ndiaye PI, Ba EHB, Bah MD, et al. Prise en charge péri opératoire des urgences chirurgicales abdominales chez l'adulte au CHU Aristide Le Dantec. The Pan African Medical Journal 2016;24. https://doi.org/10.11604/pamj.2016.24.190.9929.
[12] Ndong A, Gueye ML, Thiam O, Sow O, Diop A, Sarr ISS, et al. Epidemiological and Clinical Profile of Patients with Blunt Abdominal Trauma at Aristide Le Dantec Hospital of Dakar. Open Journal of Surgery 2020;4:1–4.
[13] Wade KA, Ndong SI, Kounta MB, Ngom DT, OuldEthmane S, Gassama A, et al. Evaluation of the use of Home Emergency in a Sub-Sahara African hospital: Example of the Hospital Principal in Dakar. Médecine et Santé Tropicales 2018;28:97–105. https://doi.org/10.1684/mst.2018.0765.
[14] Hanks L, Lin CP, Tefera G, Seyoum N. Abdominal Surgical Emergencies at Tikur Anbessa Specialized

Hospital in Ethiopia; A Shifting Paradigm. East and Central African Journal of Surgery 2014;19:90–4. https://doi.org/10.4314/ecajs.v19i1.
[15] Ahmed A, Dauda M, Garba S, Ukwenya Y. Emergency abdominal surgery in Zaria, Nigeria. South African Journal of Surgery 2010;48:59–62.
[16] Harissou A, Ibrahim AMM, Oumarou H, Mansour A, Amadou M, Ousseni EA, et al. Retard diagnostique et implication pronostique en milieu africain: Cas des urgences en chirurgie digestive à l'hôpital national de Zinder, Niger. European Scientific Journal, ESJ 2015;11.
[17] EL Messaoudi T. Les urgences abdominales au service de chirurgie générale de l'hopital général de grand Yoff de Dakar: aspects épidémiologique, clinique et thérapeutique 2017.
[18] A. Ndong et al., "Adult groin hernia surgery in sub-Saharan Africa: a 20-year systematic review and meta-analysis," Hernia, vol. 27, no. 1, pp. 157–172, Sep. 2022, doi: 10.1007/s10029-022-02669-9.
[19] Adamou H, Magagi IA, Habou O, Magagi A, Maazou H, Adamou M, et al. Etiologies et pronostic des occlusions intestinales aigues mécaniques à l'Hôpital National de Zinder: étude transversale sur 171 patients. Pan Afr Med J 2016;24:248. https://doi.org/10.11604/pamj.2016.24.248.8372.
[20] Ndong A, Diallo A, Tendeng J, Diao M, Niang F, Diop S, et al. Occlusions intestinales mécaniques de l'adulte : étude rétrospective de 239 cas à l'Hôpital Régional de Saint-Louis (Sénégal) 2020;20:3143–7.
[21] Sambo, B. T., Hodonou, A. M., Allode, A. S., Mensah, E., Youssouf, M., & Menhinto, D. Aspects Épidémiologiques, Diagnostiques Et Thérapeutiques Des Traumatismes Abdominaux À Bembéréké-Nord Bénin | European Scientific Journal, ESJ n.d. https://eujournal.org/index.php/esj/article/view/7207 (accessed April 22, 2023).
[22] Kassegne I, Sewa EV, Alassani F, Kanassoua KK, Adabra K, Tchangai B, et al. Prise en charge des urgences chirurgicales abdominales au centre hospitalier régional de Dapaong (Togo). J Afr Hepato Gastroenterol 2016;10:85–8. https://doi.org/10.1007/s12157-015-0649-x.
[23] Adamu A, Maigatari M, Lawal K, Iliyasu M. Waiting time for emergency abdominal surgery in Zaria, Nigeria. Afr Health Sci 2010;10:46–53.