

Article	
 PEDIATRIC SURGERY IN TROPICS www.pediatricsurgeryintropics.com editor@pediatricsurgeryintropics.com	
Pediatric surgery in tropics- Oct-2026	
ISSN 3049-3404 (online)	DOI : https://doi.org/10.70947/PST2026.42
Title	Acute Generalized Peritonitis in Children at Kara Teaching Hospital (Togo): Epidemiological, Diagnostic, Therapeutic, and Outcome Aspects
Authors	FOLLY A1, DJAFOAGOU N1, BOUME MA1, TCHAGBELE OB2, KUMA M1, BARTCHE G1, DONOU AA3, AZOUMAH KD2, AKAKPO-NUMADO GK3
Affiliation	1Department of Pediatric Surgery, Kara Teaching Hospital, Kara, Togo, 2Department of Pediatrics, Kara Teaching Hospital, Kara, Togo, 3Department of Pediatric Surgery, Campus Teaching Hospital, Lomé, Togo

Keywords	Abstract
infection, peritoneum, abdomen, child	Introduction: Acute generalized peritonitis (AGP) is a medical-surgical emergency requiring rapid diagnosis and treatment. This study aimed to describe the epidemiological characteristics, clinical and paraclinical manifestations, management, and clinical course of AGP in children at the Kara Teaching Hospital (CHU) in Togo.
Abbreviations AGP : Acute generalized peritonitis	Materials and Methods: This was a retrospective, descriptive, and analytical study conducted over a six-year period, from January 1, 2020, to December 31, 2025, in the Pediatric Surgery Department of the Kara Teaching Hospital. Results: Over a six-year period, we recorded 193 cases of acute generalized peritonitis (AGP), representing 11.49% of hospitalizations, 21.90% of surgical interventions, and 59.38% of non-malformation-related abdominal surgical emergencies in children. The mean patient age was 9.6 years. There was a male predominance, with a sex ratio of 1.29. The mean time to consultation was 7 days, and the primary reason for admission was abdominal pain, reported in all children. General condition was impaired in 90.1% of cases. Signs of peritoneal irritation were present in all children. Plain abdominal radiography revealed pneumoperitoneum in 60.13% of cases. Intraoperative findings were dominated by ileal perforations—presumed to be typhoid-related—in 73.03% of cases, followed by appendiceal perforation in 15.02%. All patients received resuscitation, antibiotic therapy, and surgery. All patients underwent a midline laparotomy. Excision and suture was the most common procedure, followed by resection-anastomosis and appendectomy (reported in 46.52%, 22.80%, and 19.69% of cases, respectively), while stoma formation was reported in 13.47%. The morbidity rate was 76.16%, dominated by wound suppuration, followed by skin suture dehiscence. The mortality rate was 6.22%. Conclusion: Over six years, these initial results highlight both the progress made and the persistent challenges regarding infrastructure, equipment, and the lack of awareness and eradication efforts concerning typhoid fever in the region or country.

Introduction

Acute peritonitis is an acute, diffuse inflammation of the peritoneal serosa resulting from chemical or bacterial insult, or from hematogenous septic inoculation of the peritoneum [1,2]. It is a frequent reason for emergency admission, particularly in developing countries where most digestive pathologies are diagnosed at the complication stage; consequently, it represents a significant public health issue in Africa [3]. According to the Hamburg classification, peritonitis is categorized into three groups: primary, secondary, and tertiary [2]. Diagnosis is primarily clinical; however, in certain situations—such as when there is doubt regarding the presence of abdominal guarding or rigidity [4]—ancillary tests may be employed, including plain abdominal radiography, ultrasound, or even abdominal CT scanning [5]. It is a medical-surgical emergency; in developing countries, its management is often characterized by delays in diagnosis and treatment, resulting in high morbidity and mortality among children [6]. The aim of this study was to describe the epidemiological characteristics, clinical and paraclinical manifestations, management, and clinical course of acute generalized peritonitis (AGP) in children at the Kara Teaching Hospital (CHU Kara).

Material and methods

This was a descriptive cross-sectional study involving retrospective data collection over a six-year period, from January 1, 2020, to December 31, 2025. All medical records of children aged 0 to 15 years who underwent surgery for AGP by the

pediatric surgery team at Kara Teaching Hospital were included in the study. Data were collected using a standardized data collection form. Patient records, hospitalization registers, and operative reports served as the source materials. Data collection was conducted while ensuring patient anonymity and confidentiality. The variables studied were epidemiological, clinical, paraclinical, therapeutic, and related to the course of the disease.

Results

Over a six-year period, 1,680 patients were hospitalized, including 193 cases of acute generalized peritonitis (AGP), representing a hospital frequency of 11.49%. AGP cases accounted for 21.90% of the 881 surgical procedures performed. During the same study period, 325 non-malformation-related abdominal emergencies were recorded; AGP cases represented 59.38% of these, ranking first among such emergencies.

There were 109 male patients (56.47%) and 84 female patients (43.52%), resulting in a sex ratio of 1.29.

The mean age was 9.6 ± 3.56 years, with a range of 3 days to 15 years. Patients aged 11 to 15 years accounted for 43.52% of cases, as shown in Table I.

Table I: Distribution of children by age group

	n	%
0-2	09	4,66
3-5	23	11,92
6-10	77	39,90
11-15	84	43,52
Total	193	100

The mean time to consultation following symptom onset was 7.51 ± 5.38 days (range: 1–30 days), with 58 children (30.05%) admitted one week after the onset of symptoms.

The clinical presentation was dominated by abdominal pain in all children, occurring either in isolation or in association with other signs. It was isolated in 34.2% of cases and associated with other signs in 65.8% (Table II).

Table II: Distribution of children according to reason for admission

	n	%
Isolated Abdominal pain	66	34,20
Abdominal pain + CBMG	24	12,43
Abdominal pain + CBMG + Fever	07	3,63
Abdominal pain + CBMG + vomiting	12	6,22
Abdominal pain + Fever	42	21,76
Abdominal pain + Fever + vomiting	05	2,59
Abdominal pain + vomiting	28	14,51
Abdominal pain + vomiting + Fever + diarrhea	9	4,66
Total	193	100

CBMG : Cessation of Bowel Movements and Gas

The initial site of pain was periumbilical in 89 children (46.11%), diffuse in 19.69%, and in the right iliac fossa in 8.81% of cases.

The mean temperature was $38.18 \pm 1.23^{\circ}\text{C}$, ranging from 35.1°C to 40.2°C . General condition was impaired in 90.67% of cases. Umbilical tenderness was present in 97.4% and abdominal guarding in 80.32%; abdominal rigidity was observed in 38 children

(19.68%). Tenderness and fullness in the cul-de-sac of Douglas were noted in 51 children (83.5%) and 10 children (6.39%), respectively, among those who underwent a digital rectal examination.

Plain abdominal radiography was performed on 158 children (81.86%); the results are presented in Table III.

Table III: Distribution of children according to plain abdominal radiography findings.

	n	%
Diffuse haziness	125	79,11
Pneumoperitoneum	95	60,13
Air-fluid level	58	35,48
Aerocoly	19	12,25
Stercoral stasis	18	11,61

Note: A patient may present with multiple radiographic signs simultaneously.

Figure 1 shows the plain abdominal radiograph of an 11-year-old adolescent admitted for abdominal pain.

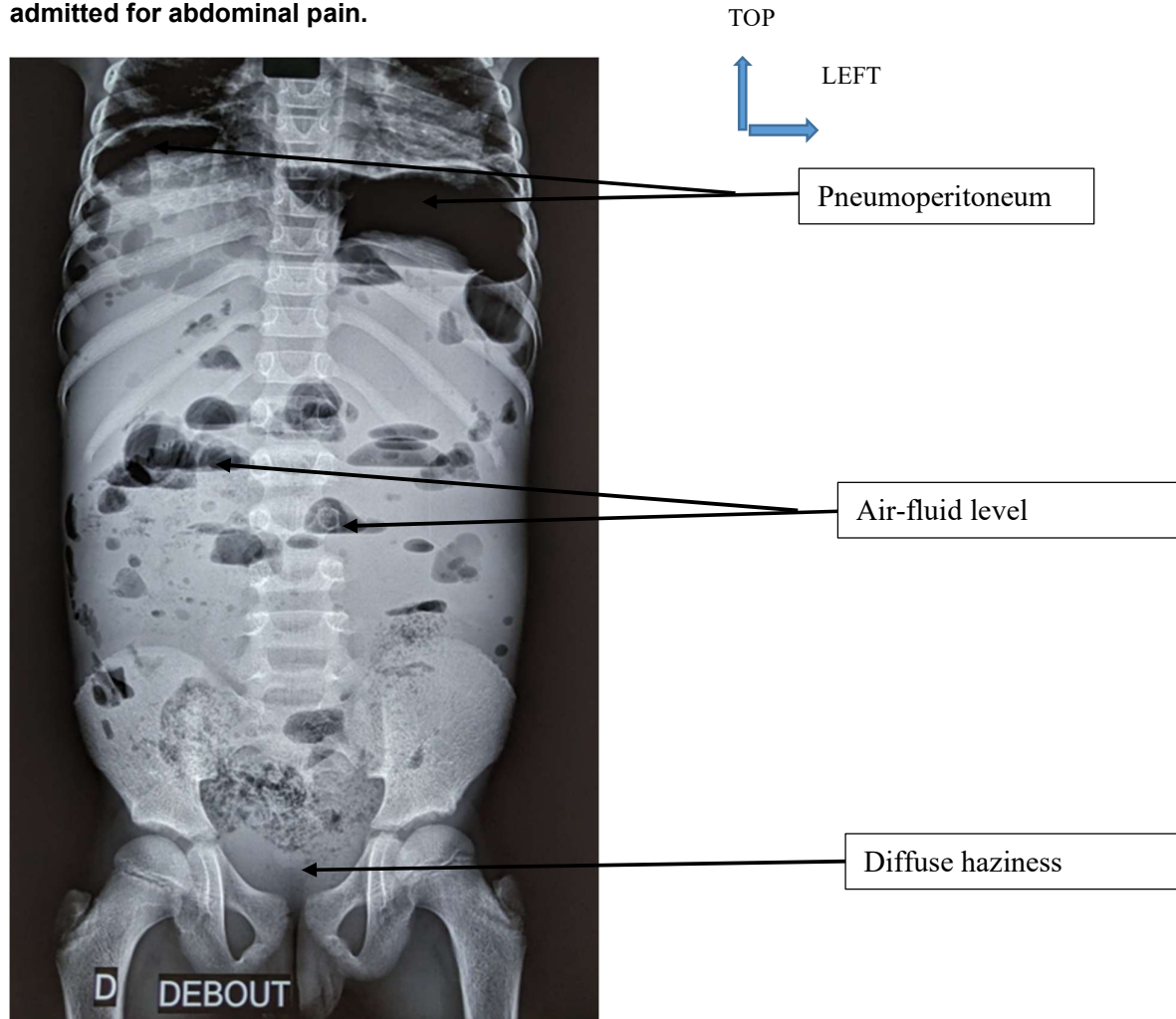


Figure 1: Plain abdominal radiograph of an 11-year-old adolescent showing pneumoperitoneum, air-fluid levels, and diffuse haziness.

A complete blood count was performed for all our patients. One hundred and thirty-five (135) patients—representing 68.7% of cases—presented with anemia, with a mean hemoglobin level of 8.4 ± 1.6 g/dL (range: 4–11 g/dL). Leukocytosis was present in 74 patients (38.34%), while leukopenia was observed in 20 children (10.36%); counts were normal in 51.30% of cases.

Blood cultures were not performed in 97.3% of cases; among the patients who did undergo the test, all results were negative.

CRP testing was performed for 51 children (26.4%); results were positive in 46 children (90.20% of those tested) and negative in 9.10% of those tested. Preoperative diagnoses included acute generalized peritonitis (93.26%), acute intestinal obstruction (4.14%), acute appendicitis (1.03%), and appendiceal abscess (1.53%).

Intraoperative findings in our study revealed non-traumatic ileal perforations in 73.03% of cases, followed by acute generalized peritonitis of appendiceal origin in 15.02% of cases.

Figure 2 shows multiple ileal perforations discovered intraoperatively.

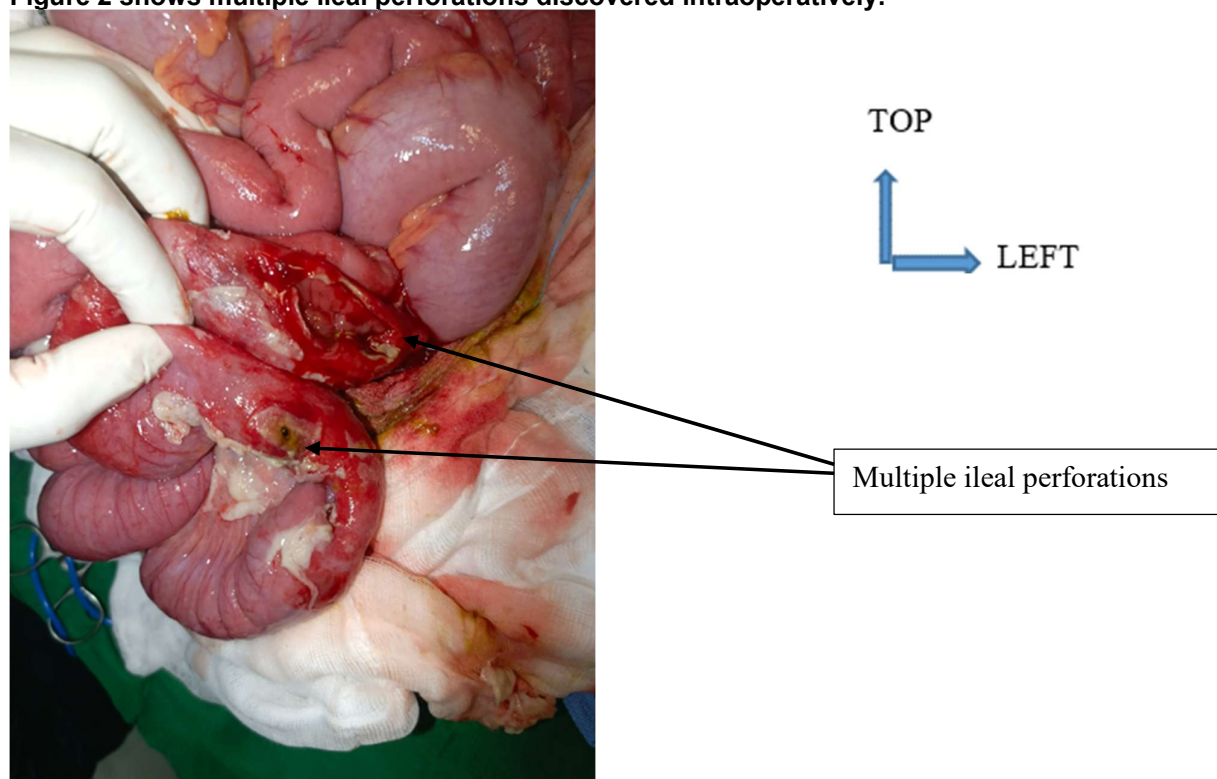


Figure 2: Intraoperative view of loops of small bowel showing multiple ileal perforations.

All patients received preoperative and postoperative resuscitation, consisting of rehydration fluid infusions, placement of nasogastric and urinary catheters, antibiotic therapy, analgesics, and, where necessary, blood transfusions.

All patients underwent a midline laparotomy. The incision was supra- and infra-umbilical in 94.81% of cases, supra-umbilical in 3.10%, and infra-umbilical in 2.02%. Surgical procedures, determined by the etiology, included intestinal excision and suture (46.51% of cases), intestinal resection and anastomosis (22.80%), and stoma formation in 26 children (13.47%). The mean duration between stoma creation and the restoration of intestinal continuity was 39.50 days (median: 31 days; range: 15–180 days); Table IV illustrates the various surgical procedures and their respective proportions.

Table IV: Distribution of children according to the surgical procedure

	N	%
Intestinal excision and suture	90	46,52
End-to-end resection and anastomosis	42	21,76
End-to-side resection and anastomosis	02	1,04
Appendectomy	38	19,69
Cholecystectomy	05	2,59
Digestive stoma	26	13,47

Abdominal drainage	193	100
Abdominal lavage	193	100

Figure 3 shows an ileal resection specimen containing all the perforations.

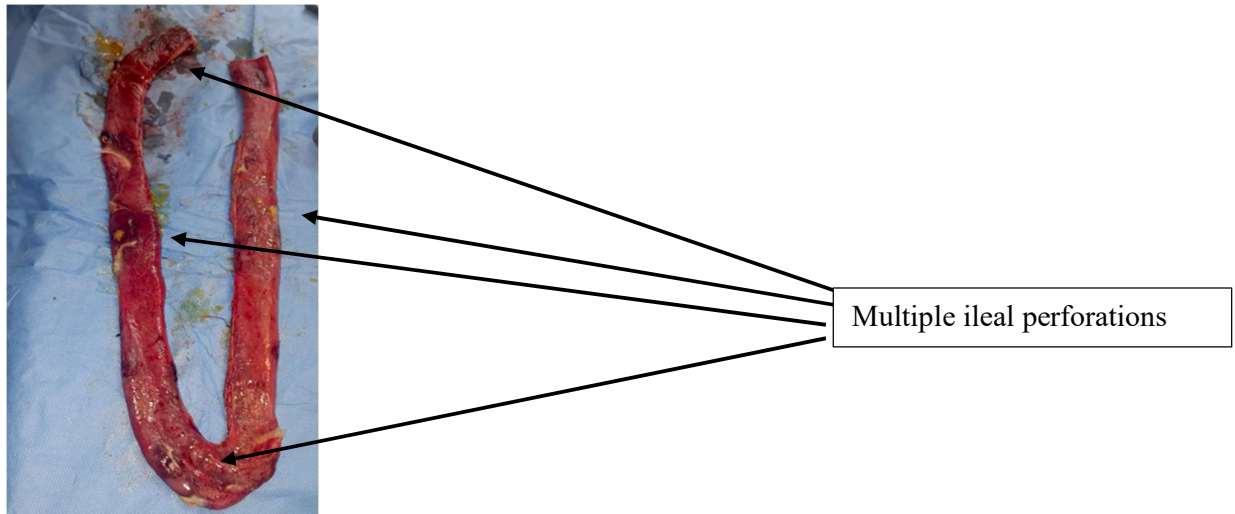


Figure 3: Ileal resection specimen including all perforations.

The postoperative course was uncomplicated in 34 cases (17.62%). We recorded 9 types of complications, summarized in Table V. We also recorded 12 deaths (6.22%) due to septic shock.

Table IV: Distribution according to postoperative course

	n	%
Simple	34	17,62
Evisceration	11	5,70
Digestive fistula	05	2,59
Postoperative peritonitis	03	1,55
Suture dehiscence	26	13,47
Abdominal wall suppuration	72	37,31
Deep suppuration	04	2,07
Incisional hernia	15	7,77
Keloid	10	5,18
Bowel obstruction due to adhesions	01	0,52
Death	12	6,22
Total	193	100

The mean length of hospital stay was 14.6 ± 7.7 days, ranging from 1 to 126 days. Sixty-five (65) children—representing 35.7% of the total—had a hospital stay in the department of between 1 and 10 days.

Discussion

DISCUSSION

Acute generalized peritonitis (AGP) accounted for a significant portion of pediatric surgical activity at the Kara University Hospital (CHU), representing 21.90% of surgical interventions. Our figures are higher than those reported by Keita et al. [7] in Guinea (2023), Fane et al. [8] in Mali (2025), and Surd et al. [9] in Romania (2020)—4.73%, 9.8%, and 12.4%, respectively. However, they are comparable to the findings of Tobome et al. [4], who reported a rate of 27.8% in Benin in 2020.

Regarding non-malformative abdominal surgical emergencies, AGP accounted for 59.38% of cases in our study, making it the leading cause of such emergencies. Several other studies have also identified AGP as the primary cause, albeit with proportions slightly lower than ours; these include studies by Tamou et al. [10] in Benin (2020: 42.4%), Khadil et al. [11] in Niger (2024: 47%), Keita et al. [7] in Guinea (2023: 52.6%), and Benié et al. [12] in Côte d'Ivoire (2023: 52.4%). This predominance is likely attributable to the high prevalence of typhoid fever in northern Togo.

The mean age was 9.6 ± 3.56 years. Studies by Bakhou et al. [13] and Kouame et al. [14] noted similar mean ages of 10 years and 9 years, respectively.

The mean time to consultation after symptom onset was 7 ± 5.38 days. This delay in seeking care is attributed to a lack of awareness and, above all, the limited purchasing power of these populations. This long delay was also reported by Kouyaté et al. in Mali [15] (7 days), as well as by Tamou [10] in Benin, Fane et al. [8] in Mali, Khaldi et al. [11] in Algeria, and Chukwubuike et al. [16] in Nigeria, who reported delays of 5.5, 5.83, 8.3, and 4 days, respectively. In contrast, Surd et al. [9] in Romania reported a delay of two (2) days.

Abdominal pain was the reason for consultation in all children; it presented in isolation in 34.20% of cases and was associated with other signs in 65.80% of cases. As the primary symptom, abdominal pain was reported in 100% of cases by several authors [7, 10, 11].

Fever was noted in 75% of cases. In studies by Fane et al. [8] in Mali, Surd [9] in Romania, and Khaldi [11] in Algeria, fever was present in 56.7%, 69.1%, and 68% of cases, respectively. While fever is a key symptom of peritonitis, other studies have shown it to be present in all patients [7, 15]. The absence of fever in our study—and in many others where the prevalence is well below 100%—is likely due to antipyretic treatment administered to some children prior to admission.

Umbilical tenderness was present in almost all children, followed by abdominal guarding in 97.4% and 80.22% of cases, respectively; abdominal rigidity was observed in 38 children, representing 19.68% of the study population. The presence of abdominal rigidity confirms the diagnosis of acute generalized peritonitis [17], although it may be replaced by generalized guarding.

In this series, plain abdominal radiography was performed on 158 children (83.86%), aiding in etiological assessment by revealing pneumoperitoneum in 95 cases (60.13%). Our findings are similar to those of Keita, who reported pneumoperitoneum in 51% of cases.

One hundred and thirty-five children (68.7% of cases) presented with anemia, with a mean hemoglobin level of 8.5 ± 1.6 g/dL. Leukocytosis was present in 38.34% of the population, and leukopenia in 10.36%. Our results align with those reported in other African studies [6, 13, 18].

Intraoperative findings in our study were dominated by non-traumatic ileal perforations, presumed to be typhoid-related in 73.03% of cases. A typhoid origin is most frequently attributed to ileal perforations in many African countries—particularly in sub-Saharan Africa—based on epidemiological arguments regarding the high prevalence of typhoid fever and poor sanitation in the regions where these studies were conducted, rather than on biological evidence [10, 16, 19]. Indeed, typhoid fever is endemic in our regions, which are characterized by low socioeconomic status, and ileal perforation is a frequent and serious complication of the disease.

Preoperative resuscitation was performed on all our patients. Labile blood product transfusions were administered to 17 children (9.34%). Our results are similar to those reported by Surd et al. [9] and Katungu et al. [20].

Laparotomy was performed on all patients, consistent with findings in several other studies [7, 8, 11, 16, 21]. Surgical procedures varied according to the etiology. Peritoneal lavage was performed on all patients; drainage was carried out in 192 children (99.34%), a result similar to that of Keita and Hakem [7, 22]. In our study, the most common procedures were excision-suture, followed by end-to-end resection-anastomosis and appendectomy. These results are close to those of

Tchukwubuike et al. [16], who performed excision-suture in 50% of cases, appendectomy in 17.30%, and resection-anastomosis in 11%. In contrast, appendectomy was the most frequent procedure performed by Fane et al. [8] (55%), followed by excision-suture (32%) and resection-anastomosis (3.4%). Postoperative recovery was uncomplicated in 17.62% of cases. Wound suppuration was the most frequent complication in our study, affecting 37.31% of the patient population. It was managed with daily local wound care and antibiotic therapy, yielding excellent results in all cases. This wound suppuration—along with other complications—was likely attributable to two factors: nosocomial infections resulting from inadequate sterilization of hospital wards, and the conditions under which acute generalized peritonitis is managed in emergency settings, where aseptic protocols may not be rigorously followed. Wound suppuration rates varied across studies by several authors—notably Keita et al. [7], Kouyate et al. [15], and Chukwubuike et al. [16]—reporting figures of 21.73%, 10%, and 23.10%, respectively. We recorded a mortality rate of 6.22%. Rates reported by other authors include 12.96% by Benié et al. [12] in Côte d'Ivoire, 13% by Kouyate et al. [15] in Mali, 3.23% by Keita et al. [7] in Guinea, and 6.67% by Surd et al. [9] in Romania.

Conclusion

Acute generalized peritonitis is a common medical-surgical emergency in developing countries; it carries significant morbidity and mortality, thereby constituting a public health issue. It is the leading non-malformative pediatric abdominal surgical emergency, accounting for one-quarter (1/4) of all surgical procedures performed. The causes are predominantly ileal perforations—likely of typhoid origin—followed by appendiceal and biliary peritonitis. Delays in treatment, resulting from poverty and a lack of awareness among these rural populations, appear to be responsible for the high morbidity (44.16%) and mortality rates. Reducing this morbidity and mortality requires early diagnosis and standardized management.

References

- [1] Bio Tamou Sambo Salako, Alexandre Allodé, Didier Sewadé Wekpon, Djifid Morel Séto, Montcho Adrien Hodonou, Babatoundé Dossou : Prise En Charge Des Péritonites Aiguës Dans Un Hôpital De District En Afrique Sub-saharienne : Cas Du Bénin ; European Scientific Journal 2017 edition Vol.13, No.36. Doi: 10.19044/esj.2017.v13n36p388
- [2] Rose M, Hamladji. Précis de sémiologie.OPU Alger Cours-de-sémiologie.Les-péritonites.2022.p4
- [3] Sow O, Diouf C, Kakpo ROA, Traore A, Diallo I, Fall B. Aspects épidémiologiques, diagnostiques et thérapeutiques des péritonites aiguës généralisées : À propos de 51 cas. Revue Africaine de Chirurgie et Spécialités. 2023;17(2) : 21–26.
- [4] Tobome SR, Hodonou AM, Wahide A, Boukari KA, Kponou M, Bankole CHE et al. Acute generalized peritonitis in a peripheral hospital centre in Benin: can it be managed by a local general practitioner? Research square. 2020 ; 1. <https://doi.org/10.21203/rs.3.rs-28536/v1>
- [5] Kassegne I, Sewa EV, Alassani F, Kanassoua KK, Adabra K, Tchangai B, Amavi AK, Attipou K. Prise en charge des urgences chirurgicales abdominales au centre hospitalier régional de Dapaong (Togo). Journal Africain d'Hépatogastroentérologie. 2016;10(2):85–88. doi:10.1007/s12157-015-0649-x
- [6] Choua O., Ali M.M., Kaboro M., Moussa K.M., Anour M. : Aspects étiologiques, cliniques et thérapeutiques des péritonites aiguës généralisées à N'Djamena, Tchad : Médecine et Santé Tropicales 2017 ; 27 : 270-273.
- [7] Keita DM, Diawara MA, Guirassy MI, Fofana N, Toure BM, Fofana H, Toure A. Prise en Charge des Péritonites Aigues Généralisées de l'Enfant au CHU Ignace Deen : À Propos de 62 Cas. HEALTH SCIENCES AND DISEASE. 2023;24(9) 0.5281/hsd.v24i9.4778
- [8] Fané M, Aspects epidemio-cliniques et thérapeutiques de la péritonite aigue chez l'enfant au centre de sante de référence de la commune I de Bamako.2025;81p 123456789/14597

- [9] Surd A, Gheban D, Mironescu A, Aldea C, Gocan H, Forssén M. Peritonitis in children. Epidemiological, clinical and therapeutical study. Jurnalul Pediatrului. 2020;(89/90):9. doi:10.37224/JP.2020.8990.02
- [10] Tamou SB, Mg Y, Ma H, Dm S, Sa A. Urgences Chirurgicales Abdominales Pédiatriques Au Nord-Bénin : Aspects Epidémiologiques Et Diagnostiques. European Scientific Journal, ESJ. 2020;16(18):132–132. doi:10.19044/esj.2020.v16n18p132
- [11] Khaldi HF, Zerki S, Saadi Z, Benkou FZ. Prévalence de la péritonite chez l'enfant expérience du service de la chirurgie pédiatrique de l'EHS Tlemcen. University of Tlemcen; 2022:91p
- [12] Bénéié L, Traore, Kouakou, Kpangni, Bamba, N'da-Koffi. Etiologies et pronostic des Péritonites aiguës non traumatiques de l'enfant au centre hospitalier universitaire de Bouake (côte d'ivoire). Journal Africain Francophone de Chirurgie Pédiatrique (JAFCP). 2023; 4(1) : 737 - 742.
- [13] Bakhou A, Oulad Saiad M. Les Péritonites appendiculaires chez l'enfant Expérience du service de chirurgie pédiatrique générale du CHU de Marrakech ; Faculté de Médecine et de Pharmacie - Marrakech Thèse N° 25 / 2012.
- [14] Kouame BD, Ouattara O, Dick RK, Roux C. Résultats du traitement des perforations typhiques de l'enfant à Abidjan (Côte d'ivoire) : Médecine d'Afrique Noire : 2000, 47 (12), 509-511
- [15] Kouyate M, D T, M K, Haidara M. Study of Generalized Peritonitis in Children at the Hospital Fousseyni Daou of Kayes: Mali. SAR Journal of Surgery. 2022;3(4):42–45. doi:10.36346/sarjs.2022.v03i04.002
- [16] Chukwubuike KE. Peritonitis in Children: Experience in a Tertiary Hospital in Enugu, Nigeria. Clinical Surgery Research Communications. 2020;4(3):01–05.
- [17] Amine D, Mehdi B, Lassoued. 57-peritonite-aigue cours de residanat 2025.pdf
- [18] Harouna Y, Saidou B, Seibou A, Abarchi H, Abdou I, Madougou M et al. les perforations typhiques : Aspects cliniques, thérapeutiques et pronostiques Etude prospective à propos de 56 cas traités à l'hôpital national de Niamey (Niger) : Médecine d'Afrique Noire : 2000, 47(6) ; 270-275
- [19] Sakiye A, Amavi S, Dare K, Kanassoua G, Songne. Péritonites aiguës généralisées chez l'enfant à l'Hôpital Saint Joseph de Datcha: particularités étiologiques et morbi-mortalité en milieu rural au Togo à propos de 25 cas. Journal de la Recherche Scientifique de l'Université de Lomé. 2018; 20(3):485-91.
- [20] Katungu Sifa Nganza1, Muhindo Valimungighe Moise, Kambale Ketha Joel Et Ahuka Ona Longombe Albert. Prise en charge de la péritonite aigue généralisée à butembo, Est de la Republique Democratique du Congo. Revue Médicale des Grands Lacs 2020 Vol11, N°2, 3-8
- [21] Mutabazi E, Bonane A, Ndibanje AJ, Rickard J. Epidemiological study of peritonitis among children and factors predicting mortality at a tertiary referral hospital in Rwanda. East and Central African Journal of Surgery. 2017;22(3):21–28. doi:10.4314/ecajs.v22i3.3
- [22] Hakem A, Mguil W, Touti I, Alahyane H, El-Mansoury B, Ali DA, El Houate B, Boutaayamou I, El Khat A. Acute generalized peritonitis in children: A 7-year retrospective study of epidemiological, clinical, and therapeutic profiles in southeastern Morocco and 2-year forecast. Journal of Education and Health Promotion. 2025;14(1):328. doi:10.4103/jehp.jehp_2240_24

Address for correspondence	FOLLY Amavi Department of Pediatric Surgery, Kara Teaching Hospital, Kara, Togo, +228 91649213; folamavi@gmail.com
Received on 23 rd May 2025	Published on 1 st Oct 2026
Acknowledgment none	Conflicts of interest none
Source of funds none	Ethical clearance : This retrospective study was conducted in accordance with the ethical standards of Kara Teaching Hospital and the principles of the Declaration of Helsinki. Patient confidentiality and anonymity were maintained throughout the study
Citation	https://doi.org 10.70947/PST2026.42
Orcid	0000-0003-4896-4127

