OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences
Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) | ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Case Report **Pediatric Surgery**

Meckel's Diverticulitis: About 5 Pediatric Observations Collected at the Niananokoro FOMBA Hospital in Ségou, Mali

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DOI: 10.36348/sjmps.2024.v10i03.008 | **Received:** 07.02.2024 | **Accepted:** 18.03.2024 | **Published:** 21.03.2024

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Abstract

Meckel's diverticulitis or meckelitis is the infection of the Meckel's diverticulum. The aim of this work was to study the epidemiological, diagnostic, therapeutic and evolutionary aspects in the pediatric surgery department of the Niananokoro FOMBA hospital in Ségou, Mali. This was a retrospective study concerning observations between July 2010 and June 2012. We reported 5 observations in 2 years, representing a frequency of 2.5 cases per year. The average age was 6.6 years and the sex ratio was 1.5. Diagnostically, abdominal pain was the main reason for consultation followed by fever and vomiting. Physical examination found in all cases abdominal pain more or less associated with guarding in the right iliac fossa and peri-umbilical area. Abdominal bloating and contracture were noted in one case. There was hyperleukocytosis in all our 5 observations. The diagnosis was an operative discovery in 4 cases. Ultrasound was contributory in one case. Therapeutically, segmental resection of the small intestine removing the diverticulum, followed by immediate end-to-end anastomosis of the small intestine was the only technique performed in all our patients. The postoperative course was simple in 4 cases. A wall abscess with a favorable outcome was noted. Histological examination confirmed meckelitis at different stages (inflammatory, abscessed, gangrenous or necrotic). Gastric heterotopia was noted in one observation.

Keywords: Diverticulitis - Meckel - Segou – Mali.

INTRODUCTION

Described by Johann Friedrich Meckel, German anatomist, in 1809, Meckel's diverticulum (DM) is a single, blind embryonic residue, resulting from incomplete obliteration of the vitelline canal or omphalomesenteric canal and communicating with the antimesenteric edge of the small intestine at the level of the termination of the superior mesenteric artery [1, 19, 22].

It is the most common congenital abnormality of the gastrointestinal tract. It affects 2% of the population with a slight male predominance [8, 22]. DM is most often asymptomatic and is most often revealed by complications: intestinal obstructions, diverticulitis or meckelitis, intestinal bleeding. Hernias and tumors are rare [21, 26].

Just like the appendix, the DM becomes infected. This infection of the DM defines diverticulitis or meckelitis first described in 1897 by Pique and Guillemont [5, 22].

It represents 20% of DM complications [18, 19, 26] and has an incidence of 2.3 cases per year in the

pediatric population [8]. The sex ratio is estimated at 2.8. The average age of preference for meckelite is 5 to 6 years [10].

The diagnosis of meckelitis is most often discovered operatively in the face of a non-specific acute surgical abdomen syndrome [1, 6, 8, 15, 22].

Histology of the surgical specimen confirms inflammation of the diverticulum with or without tissue heterotopia [1]. The treatment is surgical and most often consists of segmental resection of the small intestine on either side of the MD followed by immediate end-to-end anastomosis [1, 5, 21, 22].

The surgical aftermath is generally simple. However, complications are reported, 11% according to Soltero [27].

The African literature on DM and its complications in children is sparse. In Morocco, Niaré [21] reports 14 cases of DM in 3 years and Hammoumi [15] 28 cases of complicated DM in 24 years; in Tunisia, Beyrouti [8] reports 42 cases of complicated DM in 18 years.

We found this pathology interesting given the few studies devoted to it and the number of observations we obtained in 2 years. Our work aimed to report the epidemiological, diagnostic, therapeutic and evolutionary aspects of meckelite in the pediatric surgery department of the Nianankoro FOMBA Hospital (HNF) in Ségou, Mali.

Comments

Observation 1

Bouaré I, a 4-year-old boy with no known pathological history, was admitted to the emergency reception department of the HNF on July 12, 2010 for abdominal pain associated with vomiting of food lasting for 72 hours. On clinical examination he was in good general condition, with a weight of 15 kg, normal-colored conjunctivae, a temperature of 39.7°C, a pulse of 80 beats/min, a respiratory rate of 27 cycles/min. Abdominal palpation revealed unresponsive pain in the IDF and in the periumbilical region. The remainder of the physical examination was unremarkable. An ASP x-ray and abdominal ultrasound were unremarkable. On the CBC, there was hyperleukocytosis at 30,000/mm3. The diagnosis of acute surgical abdomen of probable appendicular origin was retained and was the subject of a surgical indication. A peripheral venous line and an indwelling urinary catheter were placed. The surgical procedure carried out the same day (under general anesthesia, intubated patient) using a straight transverse approach in the middle abdominal fold revealed a healthy appendix; the diagnosis of meckelitis was intraoperative. The DM had an inflammatory appearance and measured 10/2 cm and had an aberrant vascular pedicle curving its tip on the lateral aspect of the small intestine (Figure 1). Segmental resection of the small intestine removing the DM followed by immediate end-to-end small bowel anastomosis was performed. A nasogastric tube and abdominal drain were inserted intraoperatively. The post-operative course was straightforward. The patient was discharged home after 7 days. Pathological examination of the surgical specimen revealed an inflammatory process of the diverticular small bowel wall without heterotopia. There were no complications in Bouaré I after 6 years.

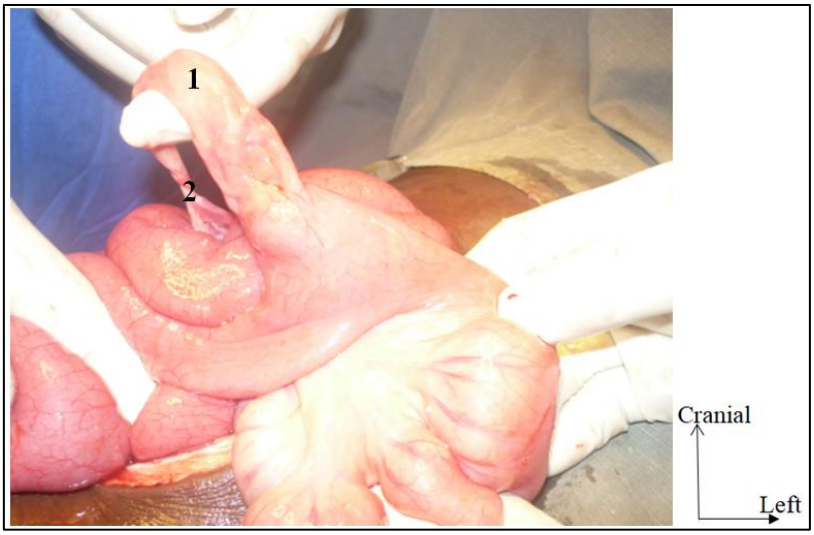

Figure 1: Abscessed Meckelitis (1) with aberrant vascular pedicle (2) curving the tip of the DM on the lateral aspect of the small bowel [HNF, Ségou]

Observation 2

Coulibaly L, a 5-year-old boy, was referred by Markala Hospital and admitted on 28 August 2011 to the general paediatrics department of the HNF for yellowish vomiting, abdominal pain and fever. After 24 hours of well-conducted antimalarial treatment for a positive but

unsuccessful thick blood drop, the patient was referred to paediatric surgery for an opinion. The patient had no particular pathological history, had a moderate deterioration in general condition, weighed 17 kg, had normo-coloured conjunctivae, a temperature of 38.5°C, a pulse of 76 beats/min and a respiratory rate of 30 cycles/min. Palpation revealed non-defensive abdominal pain in the IDF. A PSA X-ray and abdominal ultrasound were normal. The CBC showed a hyperleukocytosis of 12,000/mm3. The diagnosis of acute appendicitis was suspected and the patient was referred to the paediatric surgery department. In addition to the peripheral venous line, an indwelling urinary catheter was placed. A laparotomy was indicated. After brief fluid and electrolyte resuscitation, the child was admitted to the operating theatre. Laparotomy under GA via a transverse skin incision in the mid-abdominal fold revealed a healthy appendix and Meckel's diverticulitis. The DM was abscessed. It measured 11/2 cm and was connected to the umbilicus by a fibrous clamp (Figure 2).

Segmental resection of the small intestine removing the DM followed by immediate end-to-end anastomosis of the small intestine was performed. A nasogastric tube and an abdominal drain were placed intraoperatively. The postoperative course was simple. Return home was authorized on postoperative day 7. Pathological examination of the surgical specimen showed an inflammatory process of the small diverticular wall with micro-foci of acute abscessing inflammation of the mucosa and submucosa without heterotopia. No complications were found in Coulibaly L after 5 years.

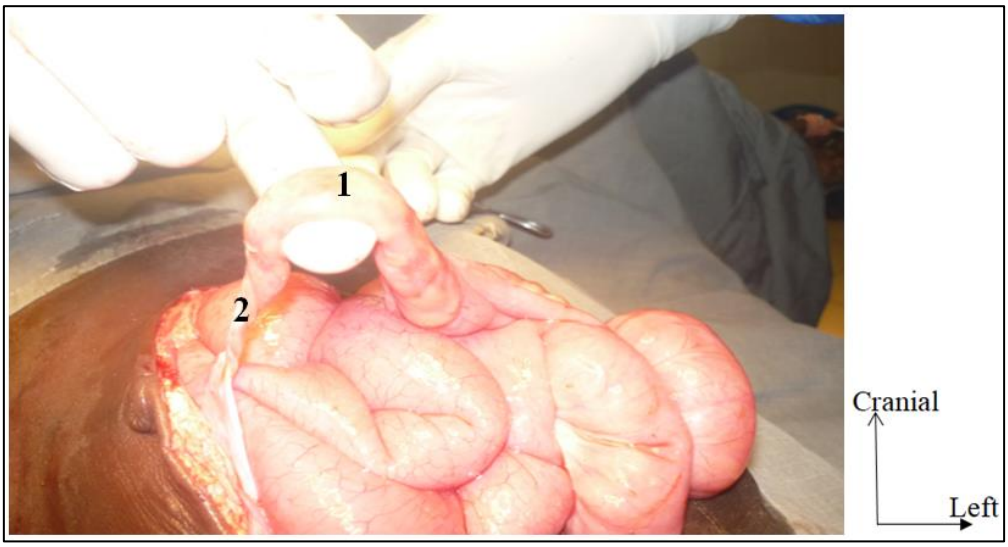

Figure 2: Meckelite (1) with a fibrous flange (2) connecting the top of the DM to the posterior surface of the umbilicus [HNF, Ségou]

Observation 3

Diarra B, a 6-year-old girl with no known pathological history, was admitted to the HNF emergency department on December 8, 2011, for abdominal pain, bilious vomiting, abdominal bloating and fever that had been going on for more than a week. Antimalarial, antityphoid and analgesic treatment of an unspecified nature was administered without success before his admission. On clinical examination, his general condition was altered. There were signs of dehydration; weight at 18 kg, pale conjunctivas, temperature at 37.8°C, pulse at 90 beats/min, respiratory rate at 30 cycles/min. On examination of the abdomen, distension, diffuse pain and contracture were noted. Hydro-aerial levels and diffuse grayness were observed on the ASP radiograph. On the CBC, there was anemia at 10 g/dl. The diagnosis of acute generalized peritonitis of appendiceal or typhoid origin by ileal perforation was retained and was the subject of a surgical indication. In addition to the peripheral venous line, a urinary catheter and a nasogastric tube were placed and a hydro-electrolyte rehydration protocol applied. Midline laparotomy discovered a PAG related to a perforated meckelite (figure 9). The DM was gangrenous, perforated at its top and measured 8/1.5 cm. Pus aspiration with a sample for bacteriological examination followed by cleaning of the peritoneal cavity was performed. Segmental resection of the small intestine removing the DM followed by immediate end-to-end anastomosis of the small intestine was performed. An abdominal drain was placed. The patient was admitted to intensive care in the immediate postoperative period. She was transferred to the pediatric surgery department on postoperative day 2. The postoperative course was marked by a wall abscess which evolved favorably. Pathological examination of the surgical specimen revealed an inflammatory process of the abscessing diverticular wall with localized gangrene and areas of heterotopia in the gastric mucosa. No complications were found in Diarra B after 5 years.

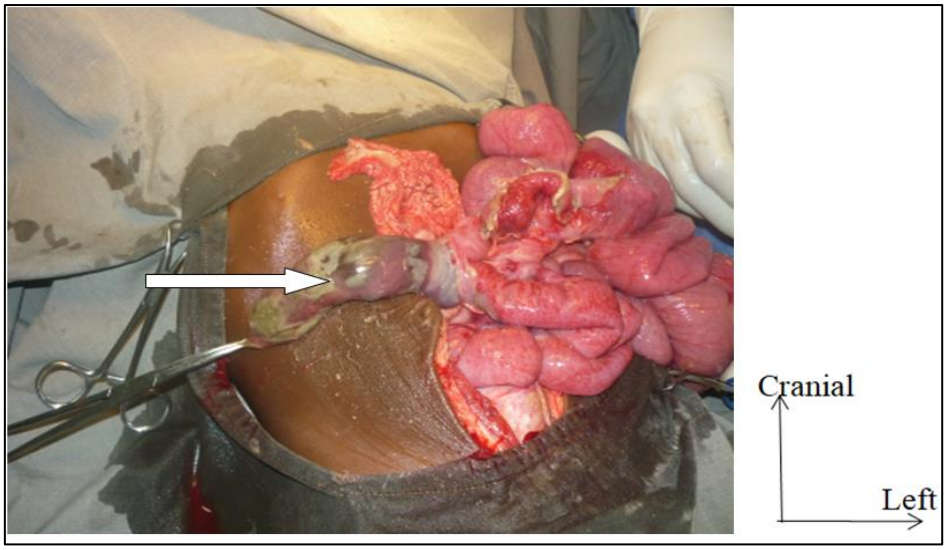

Figure 3: Gangrenous Meckelitis [HNF, Ségou]

Observation 4

Traoré A is a 12-year-old patient with no known pathological history. She was admitted to the emergency department of the HNF on March 18, 2012 for abdominal pain, postprandial vomiting of food for 2 days, associated with a febrile state. His general condition was good, with a weight of 32 kg, normal-colored conjunctivae, temperature of 38°C, pulse of 86 beats/min, respiratory rate of 28 cycles/min. We found a painful abdomen in the periumbilical region and in the right iliac fossa, with localized guarding. An abdominal ultrasound showed a blind tubular digestive structure in the periumbilical region with thickening of the wall, surrounded by a layer of peritoneal effusion. The CBC showed hyperleukocytosis at 15,000/mm3. The diagnosis of meckelitis was suspected and the surgical indication was made. Laparotomy confirmed the diagnosis of meckelitis. The DM measured 5/1 cm and was necrotic (Figure 4). The appendix was healthy. Segmental resection of the small intestine removing the DM followed by immediate end-to-end anastomosis of the small intestine was performed. An abdominal drain and a nasogastric tube were placed intraoperatively. The patient was admitted to the pediatric surgery department. The postoperative course was simple. Return home was authorized on postoperative day 7. Pathological examination of the surgical specimen showed diverticular necrosis without heterotopia. No complications were found in Traoré A after 4 years.

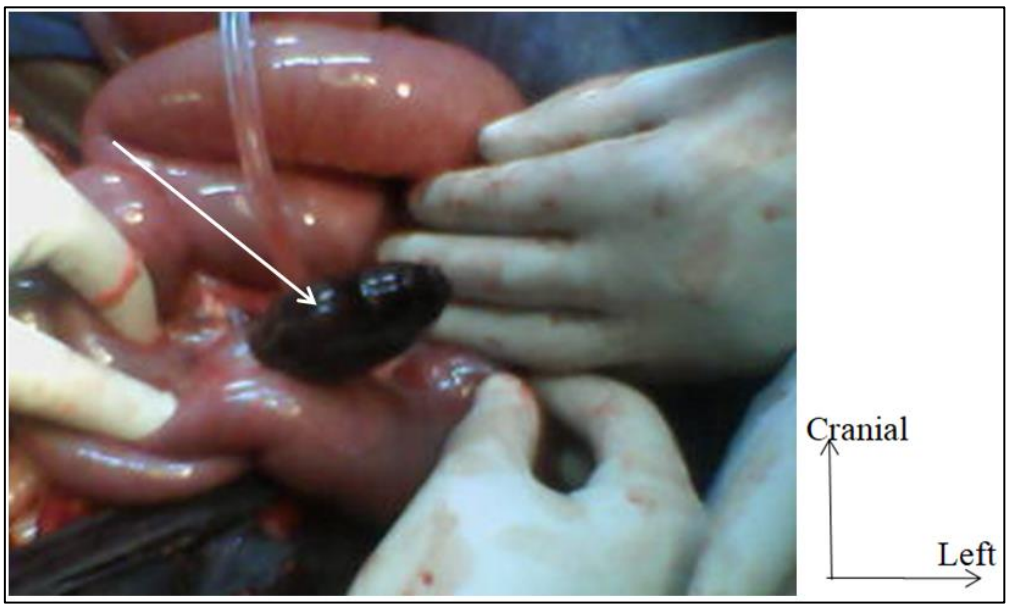

Figure 4: Necrotic Meckelitis [HNF, Ségou]

Observation 5

Diallo S is a 6-year-old patient with no known pathological history. He was admitted to the emergency reception department of the HNF on June 8, 2012 for abdominal pain and vomiting of food for 3 days. His general condition was good, with a weight of 20 kg,

normal-colored conjunctivae, temperature of 38.8°C, pulse of 78 beats/min, respiratory rate of 26 cycles/min. Abdominal palpation revealed a painful abdomen in the right iliac fossa, defenseless. An abdominal ultrasound showed a blind tubular digestive structure at the level of the IDF with thickening of the wall, surrounded by a layer of peritoneal effusion. The CBC revealed hyperleukocytosis at 20,000/mm3. Two diagnostic hypotheses were mentioned: acute appendicitis and meckelitis. The surgical indication was established. Laparotomy confirmed the diagnosis of meckelitis. The diverticulum measured 10/1 cm and was necrotic (Figure 5); the appendix was healthy. Segmental resection of the small intestine removing the DM followed by immediate end-to-end anastomosis of the small intestine was performed. An abdominal drain and a nasogastric tube were placed intraoperatively. The patient was admitted to the pediatric surgery department. The postoperative course was simple. Return home was authorized on postoperative day 7. Pathological examination of the surgical specimen showed diverticular necrosis without heterotopia. No complications were found in Diallo S after 4 years.

Figure 5: Necrotic Meckelitis [HNF, Ségou]

DISCUSSION

DM is a disease of small male children [19, 22]. This situation was found in our study. Infection is the second most common complication of this diverticulum after occlusion [26].

It has an incidence of 2.3 cases per year, an average age of 5 to 6 years and an estimated sex ratio of 2.8 [8, 10]. This situation is also found in our study, which reports an incidence of 2.5 cases per year, an average age of 6.6 years and a sex ratio of 1.5.

The particularity of our study lies in the fact that we have no DM revealed by an occlusion. Similarly, the other forms of complicated DM, i.e. intestinal haemorrhage, Littré hernia and neoplasia, were not found during the study period.

In our study, meckelitis is probably due to the length of the diverticulum, which exceeds 5 cm in all our patients, and the narrowness of the neck, which is always between 1 and 2 cm. These forms of diverticulum are frequently the cause of meckelitis due to fluid stasis, which favours microbial proliferation and therefore infection of the diverticulum [1, 22].

The clinical symptoms of meckelitis are not very specific, so the diagnosis is often made intraoperatively [4, 8]. In our study, spontaneous and provoked abdominal pain, vomiting and fever were constant. However, in our study, they do not point to the diagnosis of meckelitis in the pre-operative period.

Acute appendicitis is the diagnosis most often evoked in the presence of these signs, probably because it is the most frequent abdominal surgical emergency [6].

There is also the fact that abdominal pain is often localised to the IDF, making the diagnosis of appendicitis more plausible.

The CBC always shows an inflammatory syndrome, which is not specific, but may point to an inflammatory abdominal disease if it is associated with abdominal manifestations.

Ultrasound can be helpful [26]. However, it is only useful in one of our patients. Ultrasound and PSA radiography are the two imaging examinations requested in our context. The latter may show non-specific images [6], as in our study.

Treatment of meckelitis is based on antibiotics and open or laparoscopic surgery [6, 18, 22]. All our patients underwent antibiotic treatment and segmental resection of the small bowel, including the diverticulum,

followed by immediate end-to-end anastomosis. This procedure gave good results in our patients, all of whom returned home after a week's hospitalisation.

This segmental resection seems to us to be more logical in view of the possibility of heterotopia at the level of the diverticulum. Indeed, if heterotopia is left in place as a result of isolated resection of the diverticulum, it exposes the patient to its own complications: peptic ulcers, intestinal perforations and neoplasia [4, 19].

Our approach of segmental resection is all the more justified as one child in our series presented with gastric heterotopia.

CONCLUSION

The clinical presentation of meckelitis mimics that of appendicitis or an acute surgical abdomen:

- Think of meckelitis in any case of acute surgical abdomen in small children;
- Carry out segmental resection of the small intestine followed by immediate end-to-end anastomosis. Not only does this give good results in our context, it also avoids the risk of leaving a mucosal heterotopia, with all the attendant risks of complications.

REFERENCES

1. Alaya, H. Z. B, Bakir, D., Hammami, M., Tilouch, S., Kriaa, S., & Harzallah, L. (2011). Meckel's diverticulitis in an infant. *Arch Pediatr*, *18*(9), 1001-1003.
2. Alkan, M., Güler, G., Yildirim, F., Doran, F., Zorludermir, U., & Olcay, I. (2009). Perforation of an inflamed Meckel's diverticulum in a newborn: report of a case. *Turk J Gastroenterol*, *20*(3), 235-236.
3. Baldisserotto, M. (2004). Color Doppler sonographic findings of inflamed and perforated Meckel diverticulum. *J Ultrasound Med*, *23*(6), 843-848.
4. Barbary, C., Tissier, S., Floquet, M., & Regent, D. (2004). Imaging complications of Meckel's diverticulum. *J Radiol*, *85*(3), 273-279.
5. Bechraoui, T. (2015). Complications of Meckel's diverticulum. Les Mardis Pédiatriques, 41-44. Available at: http://mardis-pediatriques.com/pdf/pdf_143411650333120.pdf. Accessed 04/04/2016.
6. Becmeur, F. (2005). Peritonitis in children and infants. Strasbourg: CHU de Strasbourg. Available at http://polysencreims.free.fr/polys/CPCP/Item275%20Perito nite%20aigue.pdf. Accessed 10/03/2016.
7. Bennett G. L., Birnbaum, B. A., & Balthazar, E. J. (2004). CT of Meckel's diverticulitis in 11 patients. *AJR Am J Roentgenol*, *182*(3), 625-629.
8. Beyrouti, M. I., Beyrouti, R., Abid, M., Ayadi, L., Abid, O., Derbel, R., ... & Ghorbel, A. (2009). Complications of Meckel's diverticulum. Report of 42 cases. *La Tunisie medicale*, *87*(4), 253-256.
9. Bogaert, W. (1951). Intestinal perforation by roundworm: a case report. *Ann Soc Belg Med Trop*, *31*(2), 303-306.
10. Carlioz, P. (2014). Meckel's diverticulum, from embryology to surgery. *ANC E-Memories*, 131-136. Available at: http://www.academie-chirurgie.fr/ememoires/005_2014_13_2_001x006.pdf. Accessed 18/05/2016.
11. Chamming's, F., Chiavassa-Gandois, H., Loustau, O., Sans, N., & Railhac, J. J. Haemorrhagic Meckel's diverticulum. Intérêt de l'imagerie médicale - à propos d'un cas [on line]. Available at: http://pe.sfrnet.org/Data/ModuleConsultationPoster/pdf/2005/1/61066eec-d74a-4f6a-94a1-501eea2652ef.pdf. Accessed 10/06/2016.
12. Cissé, M., Konaté, I., Dieng, M., Fall, M. B., Ka, O., & Touré, C. T. (2008). Meckel's diverticulum complicated by intestinal occlusions: management in Dakar, about 10 cases. *J Afr Chir Digest*, *8*(2), 782-787.
13. College National Hospitalier Et Universitaire De Chirurgie Pediatrique. Paroi abdominale et pathologies du canal omphalomésentérique. Available at: http://www.sofop.org/Data/ModuleGestionDeContenu/application/246.pdf. Accessed 09/04/2016.
14. Grapin, C., Bonnard, A., & Helardot, P. G. (2005). Surgery of Meckel's diverticulum. *EMC – Chirurgie*, *2*(6), 613-620.
15. Hammoumi, Z. (2003). Complicated Meckel Diverticulum in Children (A propos de 28 cas) [Thèse Médecine]. Casablanca: Université Hassan II; n°327.
16. Harouna, Y., Saidou, B., Seibou, A., Abarchi, H., Abdou, I., Madougou, M., ... & Bazira, L. (2000). Typhoid enteric perforation. Diagnosis, therapeutic options and predictive prognostic indices. A report of 56 cases in Niamey National Hospital (Niger). *Médecine d'Afrique Noire*, *47*(6), 269-275.
17. Horlin, C., Sergent, H., Delhove, O., & Gilbeau, J. P. (2006). Enterolith and Meckel's diverticulitis. *J Radiol*, *87*(3), 320-322.
18. Jobin, A. C., Briner, L., Brugger, J. J., & Worreth, M. (2015). Meckel diverticulum perforated by a fish bone. *Swiss Medical Forum*, *15*(35), 780-781.
19. Leyre, P. (2016). Meckel diverticulum. Poitiers: Service de chirurgie viscérale CHU de Poitiers [online]. Available at: http://docplayer.fr/23792823-Diverticule-de-meckel.html. Accessed 07/04/2016.
20. Mirza, M. S. (2007). Incarcerated Littre's femoral hernia: case report and review of the literature. *J Ayub Med Coll Abbottabad*, *19*(2), 60-61.
21. Niare, M. (2012). Le diverticule de Meckel chez l'enfant: à propos de 14 cas au CHU Mohammed VI de Marrakech [Thèse Médecine]. Marrakech: Université Cadi Ayyad, 41-12.
22. Ouassissou, H. (2009). Pathologies du canal omphalomésentérique: à propos de 4 cas [Thèse

Médecine]. Fès: Université Sidi Mohammed Ben Abdellah; 2-9. Available at: http://scolarite.fmp-usmba.ac.ma/cdim/mediatheque/e_theses/2-09.pdf. Accessed 17/02/2016.

23. Pellerin, D., Harouchi, A., & Delmas, P. (1976). Meckel's diverticulum, review of 250 cases in children. *Ann Chir Infant*, 17, 157-172.
24. Redon, H., D'alincourt, A., Pondevie, R., & Lerat, F. (2001). Meckel's diverticulitis in adults diagnosed by CT scan. *J Radiol*, 82, 261-263.
25. Sauvat, F., & Revillon, Y. (2010). Le diverticule de Meckel et la pathologie omphalomésentérique. Paris: Encycl Med Chir - Gastro-Entérologie [9-075-M-10]; 2010.
26. Schmutz, G., Joidate, A., Aubé, C., Phi, I. N., Provost, N., & Fournier, L. (2003). Occlusion intestinale et diverticule de Meckel. *Feuillets de radiologie*, *43*(3), 223-240.
27. Soltero, M. J., & Bill, A. H. (1976). The natural history of Meckel's Diverticulum and its relation to incidental removal. A study of 202 cases of diseased Meckel's Diverticulum found in King County, Washington, over a fifteen year period. *Am J Surg*, *132*(2), 168-173.
28. Timmermans, M., Willems, V., Ernould D., & Remont, A. (2016). The Meckel's diverticulum in enteroscan [online]. Available at: http://pe.sfrnet.org/Data/ModuleConsultationPoster/pdf/2010/1/abcceb85-e59f-40c3-a714-822f1162e197.pdf. Accessed 02/07/2016.