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Research Article

Meckel Diverticle: About 43 Cases at Brabois Children's Hospital

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Abstract

Introduction: The diverticulum of MECKEL is a digestive malformation present in 2% of the general population. It is asymptomatic apart from complications.

Goal: Describe the diagnostic circumstances and management of MECKEL's diverticulum.

Method: Descriptive retrospective study from January 2006 to December 2016. Patients operated for MECKEL's diverticulum and patients in whom MECKEL's diverticulum diagnosis was accidentally placed in the hospital's visceral, urological and thoracic surgery department. children of BRABOIS NANCY.

Results: We counted 43 patients including 13 girls and 30 boys. The mean age of study patients at the time of diagnosis was 4 (four) years with extremes of 0 - 16 years.

We performed 43 ultrasonographic abdominal scans, 3 CT abdominal scans and one abdominal scintigraphy.

The complications that led to the diagnosis were: 2 peritonitis (5%); 10 (23%) digestive haemorrhages; 10 (23%) intestinal intussusception and 11 (26%) occlusions.

23 (53%) laparoscopies and 11 (26%) laparotomies for segmental resection with a section margin taking away Meckel's diverticulum.

9 cases (21%) were conservatively treated as asymptomatic.

Conclusion: MECKEL's diverticulum is a relatively common digestive congenital malformation. Paraclinical examinations are of little diagnostic interest.

Laparotomy allows diagnosis and treatment. This approach tends to be replaced today by laparoscopy.

Keywords: *Meckel's Diverticulum; Complications; Laparotomy; Laparoscopy*

Introduction

The MECKEL diverticulum (DM) is a congenital anomaly found in 2% of the population [1,2]. It was first described by Johann Friedrich Meckel Von Helmsbach (1781 -1833 in Halle) in 1800, a German anatomist, one of the founding fathers of teratology.

The diverticulum of MECKEL comes from the absence of obliteration of the omphalomesenteric canal occurring between the 5th and the 10th week of embryonic life. Indeed, anatomically MECKEL's diverticulum can present itself as a simple small fibrous remnant on the anti-mesenteric edge underlined by the end of the superior mesenteric artery or a true diverticulum on the anti-mesenteric edge on the last 80 cm. from the ileum [3].

Tissues of gastric or pancreatic origin are found on histological specimens. This tissue heterotopia explains the digestive haemorrhage found in MECKEL's diverticulum. Carcinoid metaplasia is exceptional in pathology [3].

The pediatric emergencies of the child are marked by the frequency of digestive pathologies including MECKEL's complicated diverticulum.

Two percent (2%) of MECKEL's diverticula are symptomatic [1] and are characterized by complications such as intussusception, intestinal obstruction, peritonitis and haemorrhage [4].

The clinical and paraclinical diagnosis of DM is difficult. It is strongly suspected by radiological investigations such as abdominal CT scan and T99 scintigraphy [5].

Diagnostic confirmation of MECKEL's diverticulum is intraoperative [6].

The diagnostic difficulty of MECKEL's diverticulum leads us to formulate objectives.

Main Objective

To study the epidemiological, clinical, paraclinical and therapeutic aspects of MECKEL's diverticulum.

History [7]

The diverticulum was named for the first time in 1560 by the surgeon of the city of Bern, Fabricius Hildanus, the same one who described for the first time the stenosis of the pylorus. The diverticulum is then drawn for the first time in 1698 by the anatomist Frederik Ruysch, the same one who discovers the pigeon nest valves of the venous and lymphatic systems.

Without naming it, the diverticulum is described for the first time in 1700, by a French surgeon, Alexis LITTRE, by discovering it within an inguinal hernia [8].

It will be necessary to wait 100 years later Meckel, which will affirm the embryo-pathological uniqueness of the diverticulum.

Embryology [3]

At the sixth week of life, the embryo is formed into a tube connected to the appendages by the embryonic peduncle. It contains the umbilical vessels, yolk duct and allantois (Figure 1).

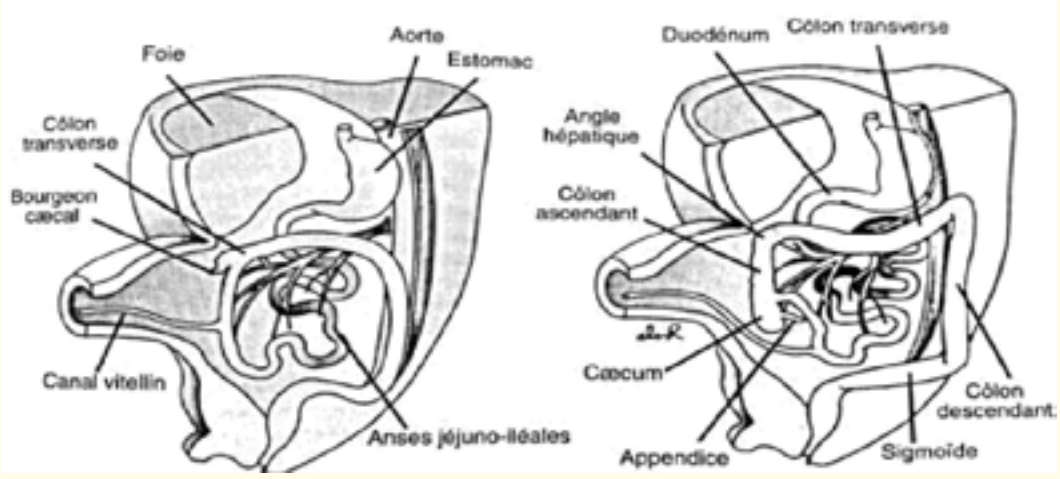


Figure 1

At the 10th week, during the integration of the herniated loops, occurs the resorption of the vitelline duct and allantois.

Towards the end of the 10th week, vitreous duct resorption abnormalities will be at the origin of various pathologies: the persistence of the omphalo-mesenteric canal; the omphalo-mesenteric cyst; omphalo-mesenteric flanges and MECKEL's diverticulum.

Method

Descriptive retrospective study from January 2006 to December 2016. Patients operated for MECKEL's diverticulum and patients in whom MECKEL's diverticulum diagnosis was accidentally placed in the hospital's visceral, urological and thoracic surgery department. children of BRABOIS NANCY.

Results

We counted 43 patients including 13 girls and 30 boys and one sex-ratio 2, 3. The mean age of study patients at the time of diagnosis was 4 (four) years with extremes of (0-16) years. We noted a high frequency of children under 4 in our series (Table 1).

Age group (year)	Diverticule of MECKEL nosymptomatic	Diverticule of MECKELSymptomatic	Total
[0-1]	5	11	16
[1-4]	2	10	12
[4-7]	1	5	6
[7-16]	2	7	9
Total	10	33	43

Table 1: *Distribution of MECKEL's diverticulum by age group.*

The complications that led to the diagnosis were: 2 peritonitis (5%); 10 (23%) digestive haemorrhages; 10 (23%) intestinal intussusception and 11 (26%) occlusions (Table 2).

	Peritonitis	Invagination intestinal	Hemorrhage digestive	Occlusion intestinal	Asymptomatic
Total	2	10	10	11	10

Table 2: *Distribution according to the complications.*

The most common complication is represented by occlusion 11 cases, followed by intussusception and gastrointestinal bleeding.

The diagnosis is made fortuitously in 10 cases during an abdominal surgery, without complication of MECKEL's diverticulum.

We performed abdominal ultrasonography (43) in all patients who had abdominal pain: 32 ultrasounds showed ultrasound signs unrelated to MECKEL's diverticulum and 11 ultrasounds related to complications of MECKEL's diverticulum.

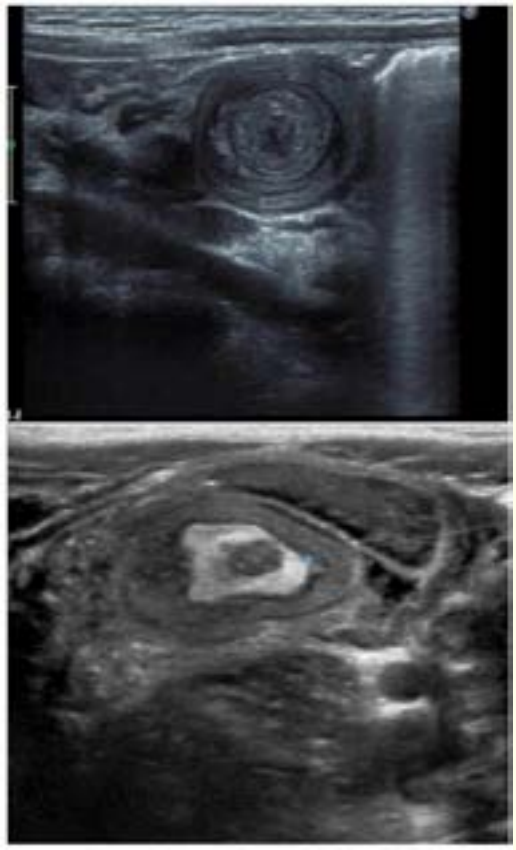
We performed 3 abdominal scans, 2 out of 3 of which (as part of the suspicion) evoke MECKEL's diverticulum diagnosis (Table 3).

	Ultrasound	Scanner	T99 scintigraphy
Intussusception intestinal acute	8	2	0
Occlusion intestinal	3	0	0
Have fun MECKEL	0	1	1
No contributory	32	0	0

Table 3: *Distribution of complications according to paraclinical explorations.*

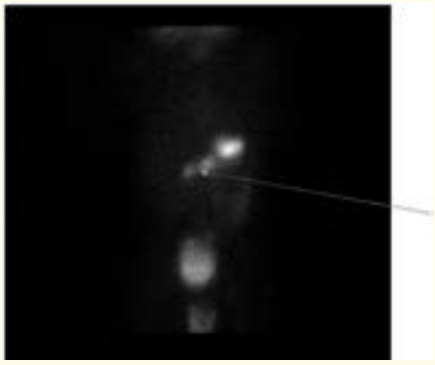
A scintigraphy was performed and showed hyperfixation in T99.

We find the image of an intestinal intussusception without specific character related to MECKEL's diverticulum.



Figures 2 and 3: *Ultrasound of an invaginated diverticulum.*

A hyperdense halo surrounds the MECKEL diverticulum found in a patient who presented to the emergency department in front of an abdominal pain chart with abdominal defense.

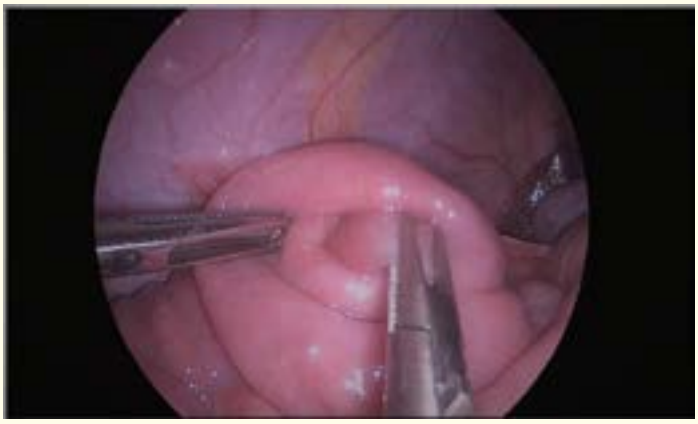


Figures 4: *Scintigraphy of a MECKEL diverticulum.*

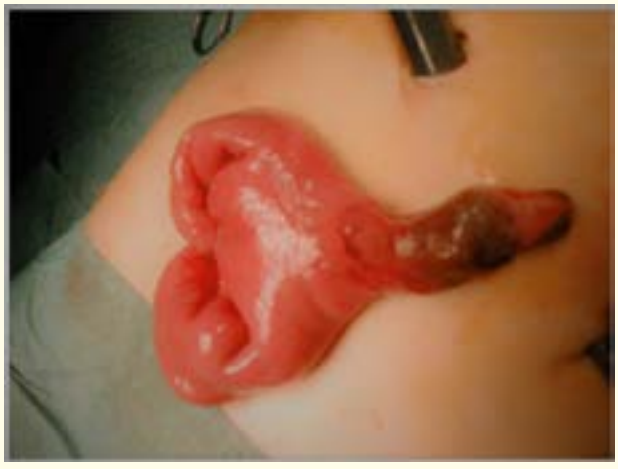
Surgical management led to laparoscopy in 23 (53%) patients and laparotomy in 11 (26%) patients for segmental resection with a section margin taking away Meckel's diverticulum. 9 cases (21%) were conservatively treated. The incidental discovery of the diverticulum was segmentally resected by an operator and retained for 9 patients. The parents of the 9 patients were informed of the presence of uncomplicated diverticulum that will be monitored. This information was recorded in the children's health record.

Laparoscopy was performed in the classic procedure in the French position, in the supine position. An 11 mm optic trocar in the open-laparoscopic umbilicus followed by a second 5 mm trocar in the left iliac fossa under visual control.

The exploration of the abdominal cavity revealed an invagination of MECKEL diverticulum in the downstream intestinal segment.



Figures 5: *Laparoscopic intraoperative image of an invaginated MECKEL diverticulum.*



Figures 6: *Diverticulum of MECKEL inflammatory externalized in right iliac fossa.*

We noted an average hospital stay of 7 days with extremes of 6 - 10 days and no postoperative complication was found.

The post-operative follow-up of the patients was 3 months.

Discussion

For a period of 10 years we diagnosed 43 MECKEL Diverticles including 30 boys and 13 girls with a sex ratio of 2. In our study the complication of the MECKEl diverticulum is more common in boy than in girl. The incidence of MECKEL's diverticulum in the general population is 2% [4].

More than half of the patients are younger than 4 years of age (Table 1).

This observation is confirmed by the data from the literature. The literature shows that symptomatic MECKEL diverticula are more frequent before the age of 4 years [9].

Frequency of discovery of complications of MECKEL diverticulum decreases with increasing age [10,11]. But in our series, this difference was not observed.

In the absence of complications, the diagnosis of MECKEL diverticulum is then made accidentally during a surgical exploration of the abdomen as well as emergency surgery and surgery.

There is no consensus on the treatment of an uncomplicated diverticulum of chance discovery. The old trend is to leave the uncomplicated diverticulum in place to avoid a long operating time and multiple digestive sutures. Then, inform the parents of the management of this diverticulum if it becomes complicated in the future.

The current trend is to treat the diverticulum to avoid future complication. In literature, for some authors the fortuitous discovery of diverticulum of MECKEL would benefit from a bowel resection carrying the MECKEL diverticulum, especially in the absence of peritonitis [1,9] related to a digestive complication. The complications are the main ways of revealing MECKEL's diverticulum diagnosis. Complications are intussusception, peritonitis, occlusion, digestive hemorrhage. We have noted relatively more occlusion in our series.

Gastrointestinal hemorrhage may be related to gastric and pancreatic tissue ectopia. We found gastric ectopia in our series in a 16-year-old patient.

Gastrointestinal hemorrhage is thought to be related to intestinal pain, the main symptom revealing in Park JJ., *et al's* study [12].

The hernia of LITTRE, an inguinal hernia whose content is a diverticulum of MECKEL, is a specific entity not found in our study [13].

The presumptive diagnosis is made in the face of the complications of MECKEL's diverticulum. The perforation of MECKEL's diverticulum is due to acute inflammation followed by ulceration of the diverticulum in its evolution.

MECKEL's diverticulum is most often asymptomatic in the general population. His diagnosis is made during complications.

Ultrasound, CT or even scintigraphic signs are not very specific. The ultrasound images describe well an intussusception without defining a diverticulum, but allow to make a presumptive diagnosis of MECKEL's diverticulum [5].

The diagnosis of certainty is made intraoperatively either by laparotomy or laparoscopy. It allows to appreciate well the lesion and to undertake the therapeutic step.

The treatment is done laparoscopically for aesthetic reasons [14], attenuates the somatic and psychological impact [15]. The operating procedures were varied: from two trocars to 3 trocars according to the experience of the operator or even the single port.

The diagnosis of MECKEL diverticulum complicated posed, the diverticulum is exteriorized by the umbilicus. For a better grasping maneuver, the need for a 3rd trocar in the right iliac fossa was welcome with careful manipulation of the intestinal loops.

A small Mc BURNEY type laparotomy is performed to externalize the MECKEL diverticulum for segmental intestinal resection of the MECKEL diverticulum with anastomosis. This procedure ends with an appendectomy in principle.

The segmental resection of the loop is performed by removing the MECKEL diverticulum and respecting a margin of section of one centimeter on both sides of the diverticulum. The realization of the gesture by the umbilicus (single port) sometimes results in a difficulty of reintegration of the intestinal loop, hence the interest of enlarging the umbilical opening to facilitate the reintegration of the intestinal loop [5].

The immediate operative follow-up was simple with a hospital stay of 10 days for the longest and 6 days for the shortest.

All patients were seen once upon discharge from hospital within 3 months. No short and medium term complications were identified postoperatively.

Shingchu., *et al*. have mentioned fewer scarring flanges in their series through laparoscopy [16]. Operative skin scars were invisible and better supported by patients [17].

Conclusion

MECKEL's diverticulum is a relatively common digestive congenital malformation. It is asymptomatic apart from complications.

Radiological examinations including ultrasound and CT have a low diagnostic sensitivity. However, the scintigraphy that is more sensitive is not available urgently.

The treatment of complicated MECKEL diverticulum is surgical, formerly by laparotomy.

Laparoscopy is now required for the management of complicated diverticulum because this approach reduces the physical and psychological impact of the surgical procedure.

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