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Meckel Diverticulum associated with volvulus and internal hernia

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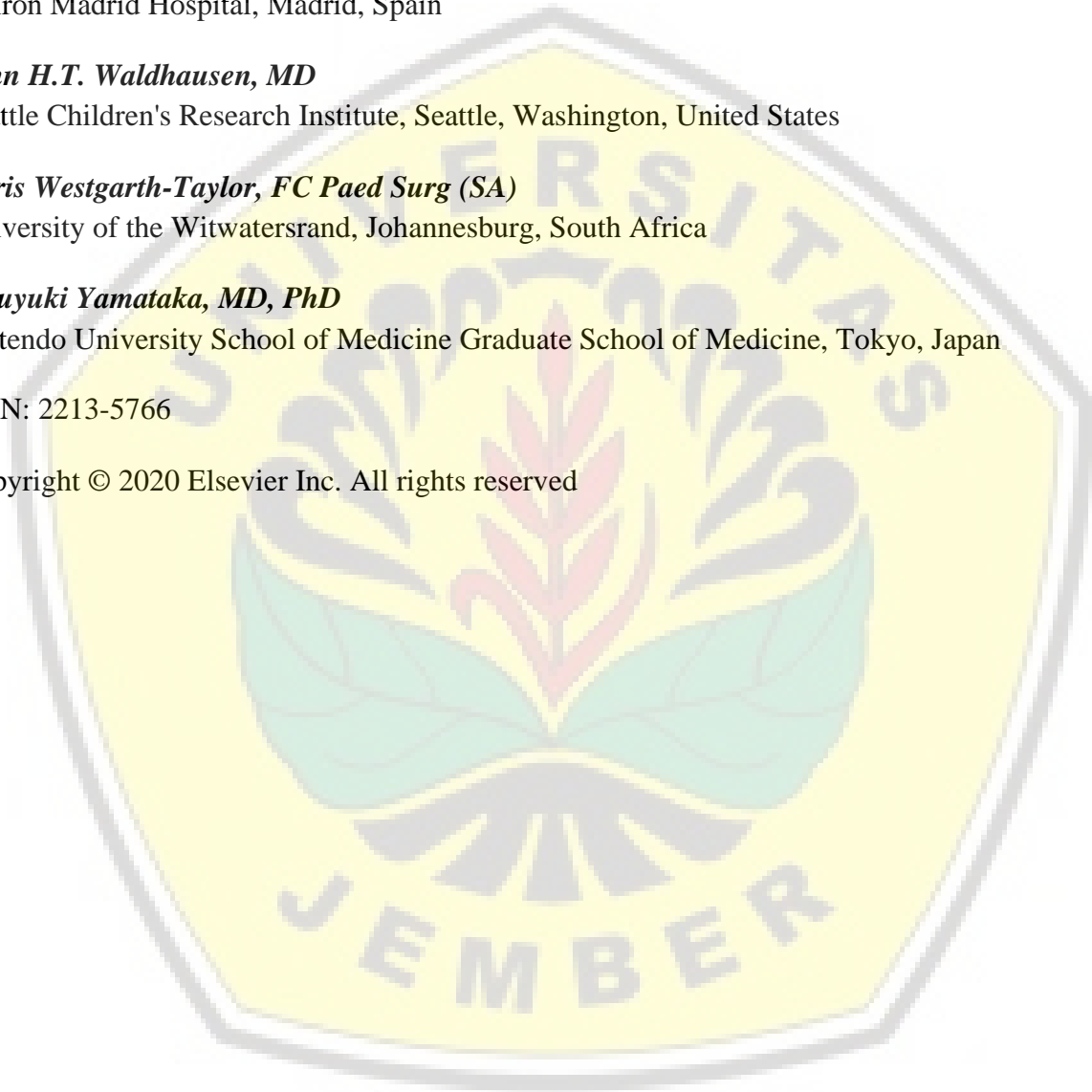


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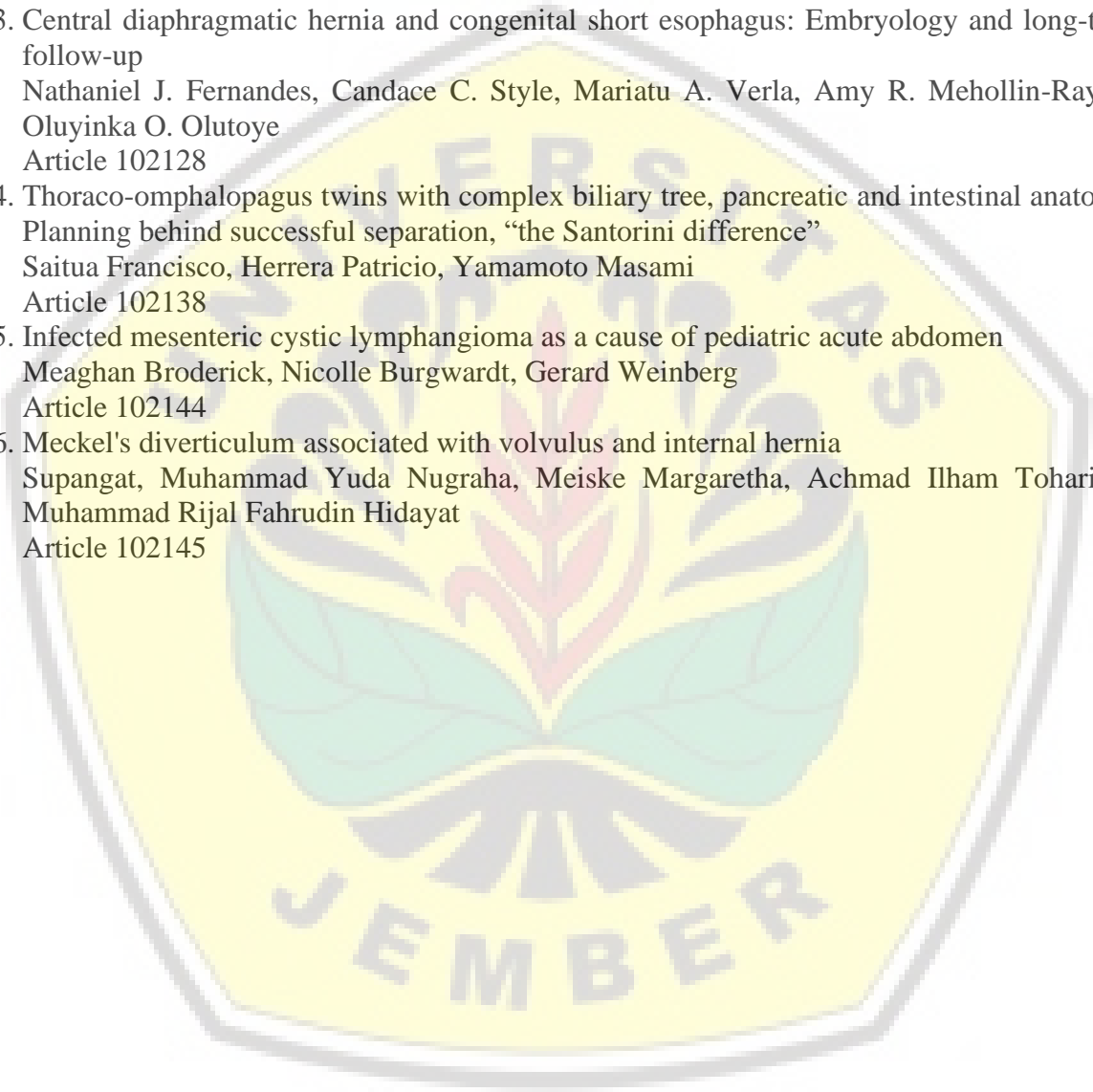
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46. Meckel's diverticulum associated with volvulus and internal hernia

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Meckel's diverticulum associated with volvulus and internal hernia

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ABSTRACT

Background: Meckel's diverticulum (MD) is congenital malformation that usually asymptomatic. MD could be emergency cases in pediatric due to the complication.

Case presentation: We report an interesting and rare case complication of MD in 5 years old children who presented with internal hernia and intestinal volvulus. The type ectopic epithelium that we have identified is an ectopic pancreatic tissue in the histopathology examination of MD resection tissue. Post-operative course, the patient got full recovery.

Conclusion: Symptomatic MD can be present as the complication that can be severe emergency cases. Complication MD that we found is intestinal volvulus with the exceedingly rare associated case of internal hernia.

1. Background

The most common gastrointestinal tract congenital malformation in pediatrics is persistence of vitello-intestinal duct that is described as Meckel's diverticulum (MD) [1]. MD is often clinically silent, but it is well known that symptomatic MD commonly presents before the age of 2 years [2]. MD could be emergency cases in pediatric patients due to complications as abdominal pain, intestinal obstruction or gastrointestinal bleeding [3]. We describe an interesting and rare case of symptomatic MD in 5 years old children who presented with internal hernia and intestinal volvulus. Internal hernia is a novel finding that is associated with MD; we did not find any article or case report about it before.

2. Case presentation

A 5 years old male child, weighing 15 kg, was admitted to Soebandi General Hospital emergency room (ER) for abdominal pain and vomiting since 4 days. The pain still remain although the patient has already treated with analgesic. The intermittent abdominal pain intensity scale is 7 based on behavioral pain scale assessment. The vital signs of the patient is within normal limits. Based on

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physical examination was found an abdominal distention sign and increased bowel sounds. Then the patient underwent a plain abdominal radiograph. In the radiological appearance (Fig. 1), there is small bowel obstruction based on herring bone appearance with multiple air fluid levels and dilated loops of small bowel.

To confirm the diagnosis, the patient underwent for blood laboratory test and abdominal ultrasound. Based on the blood laboratory test, there was an inflammation sign, leukocytosis (33.700/ μ L) with monocytes dominant, but there is no internal bleeding suspect due to haemoglobin level within normal limits. Free fluid and target sign in the right region were demonstrated on abdominal ultrasound (Fig. 2). Target sign, also known as doughnut sign, is interpreted as intestinal intussusception or volvulus. Then, the patient was planned for exploratory laparotomy.

Intraoperative findings were Meckel's diverticulum (MD) in the distal of the small intestine (Fig. 3A, yellow arrow). The small intestines at the MD area were distended, without perforation and necrosis. The small intestine had twisted around the MD with stran-



Fig. 1. Plain abdominal radiograph. There were herring bone appearance with multiple air fluid levels and dilated loops of small bowel.

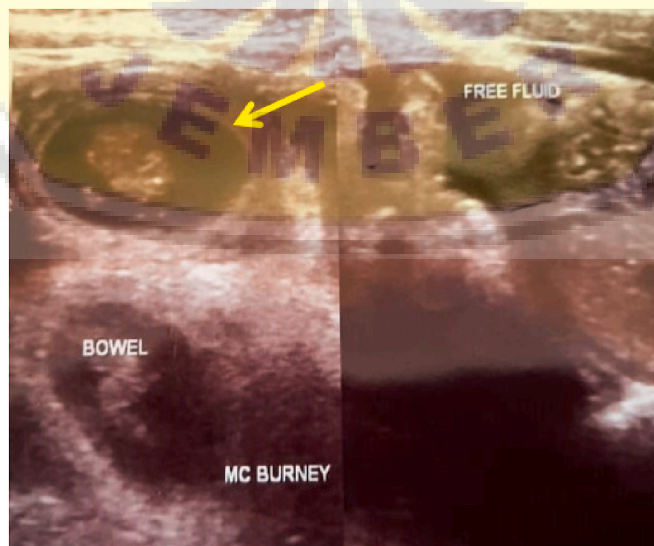


Fig. 2. Abdominal ultrasound appearance. Free fluid and target sign in the right region.

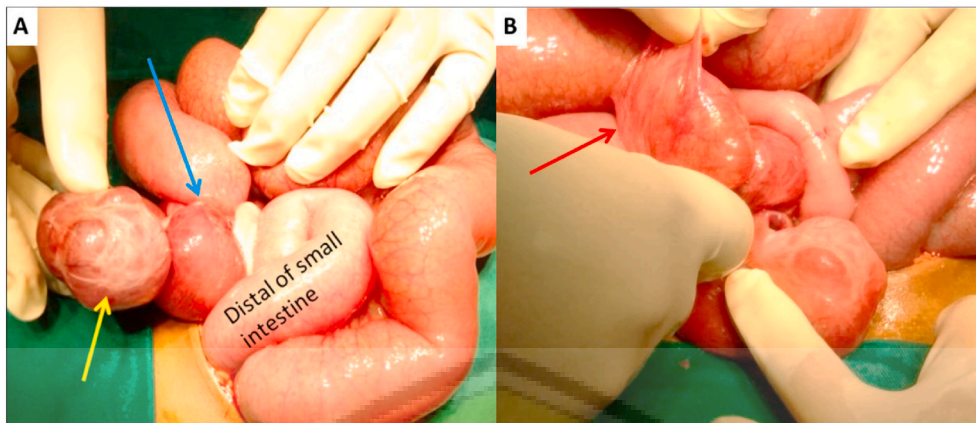


Fig. 3. Intraoperative findings: A. Meckel's diverticulum (yellow arrow) and intestinal volvulus (blue arrow) in the distal of small intestine. B. Internal hernia of small intestine at the proximal side. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

gulation sequencing volvulus, causing obstruction (Fig. 3A, blue arrow). At the proximal intestinal from MD, there are two loops of small intestine that through into a pouch with transversal section on retroperitoneal that indicate internal hernia (Fig. 3B). The illustration of this case can be seen in Fig. 4.

The MD was resected with the length is 6 cm and a diameter is 1–2 cm while the volvulus was repaired by detorsion and plication of the twisted small intestine to the anatomical position. The internal hernia was repaired by closing the defect in the retroperitoneal layer. Then the segmental resection of MD was examined an histopathological structure to ensure the MD diagnosis or any other abnormality such as malignancy. Based on histopathological analysis, the morphological appearance is three layers of small intestinal structure with no malignancy appearance (Fig. 5A). There was inflammatory cell neutrophil and lymphocytes dominant in sub mucosal and swollen serous with vasodilatation. In the other field of examination, there was found ectopic epithelium. The ectopic epithelium identified as pancreatic tissue (yellow arrow) and ileum tissue (red arrow) (Fig. 5B). Post-operative course, the patient is underwent intensive observation for the intestinal obstruction sign or surgical complication such as infection and bleeding. Then the patient made full recovery without any sequels and discharge in several days. Follow up of the patient was done in the 2 weeks after surgery to evaluate the treatment.

3. Discussion

Meckel's diverticulum (MD) was first described in 1809 by Johann Friedrich Meckel as a remaining part of the omphalo-mesenteric duct that is caused by obliteration failure. Normally, the omphalo-mesenteric duct was obliterated in the 5th to 8th weeks of gestation [4]. The popular epidemiological statistic of MD in many surgical textbooks is known as the 'rule of two' because the in-

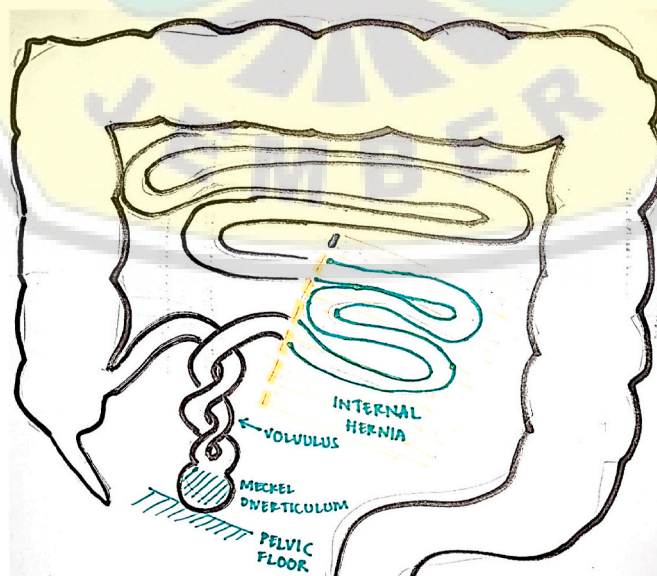


Fig. 4. Illustration case: there are MD that forming volvulus and internal hernia at the proximal site.

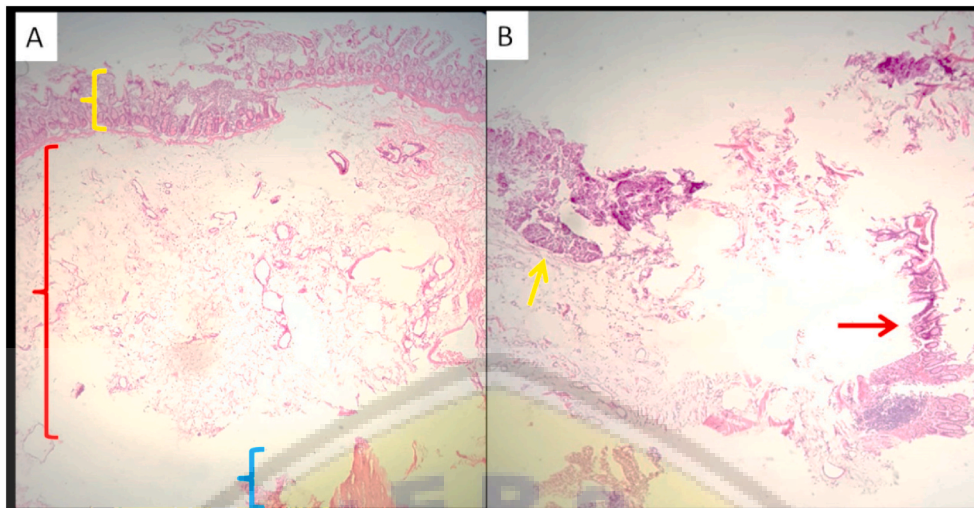


Fig. 5. Histopathological examination: A. Three layer of intestinal structure, yellow is mucosal layer; red is submucosal and blue is musculus layer. B. Ectopic epithelium finding, yellow is pancreatic tissue and red is ileum tissue. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

idence rate is 2% of the population with a 2:1 male predominance and almost always located within 2 feet of the ileocaecal valve at the terminal ileum.

Most MD clinical features are asymptomatic. However, it should be noted that symptomatic MD can be present as the complication that can be severe emergency cases [2,3]. MD often presents with hemorrhage or painless intestinal bleeding in children, in contrast with adults, the common symptoms is small intestinal obstruction [5]. But it should be considered small intestinal obstruction in children. An intestinal obstruction relating to MD in children can result from intussusception, volvulus, diverticulitis, and Littre hernia. In this case, we found that small intestinal obstruction of the patient as the result of intestinal volvulus and internal hernia. Intestinal obstruction related MD complicated with internal hernia is exceedingly rare [6]. Complications due to internal hernia associated with significant morbidities and mortality in pediatric patients [7].

Histopathological examination of the segmental resection of the MD is needed to ensure the MD diagnosis or any other abnormality such as malignancy [8]. In histopathological examination may also be identified the ectopic epithelium. The presence of ectopic epithelium in MD is associated with the main risk for occurrence of more severity of acute complication that frequently in young patients [9]. The most common type of ectopic epithelium is gastric mucosa that presents in approximately 20% [1]. In this case, the ectopic epithelium is identified as pancreatic tissue and ileum tissue. Ectopic pancreatic tissue is a rare condition that causes intestinal obstruction. It is supposed that this lesion is of vitellointestinal tract origin. Ectopic pancreatic tissue occurring alone is more common in the proximal small intestine, duodenum, and stomach than in the distal small intestine, and it is often asymptomatic [10].

4. Conclusion

Symptomatic MD can be present as the complication that can be severe emergency cases. Complication MD that we found is intestinal volvulus with the exceedingly rare associated case of internal hernia. We also found the ectopic epithelium types of MD in this case are pancreatic tissue and ileum tissue.

Ethics approval and consent to participate

The study involving a human participant to report was approved by the ethics committee of Faculty of Medicine, Jember University (IRB: 1442/H25.1.11/KE/2020). Written consent was obtained from the patient's parents.

Consent for publication

Written informed consent was obtained from the patient guardian for publication of this case report and accompanying images since the patient is under 16 years old.

Availability of data and materials

Not applicable.

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Abbreviations

MD Meckel's diverticulum

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