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Colonic atresia with modifed Santulli procedure

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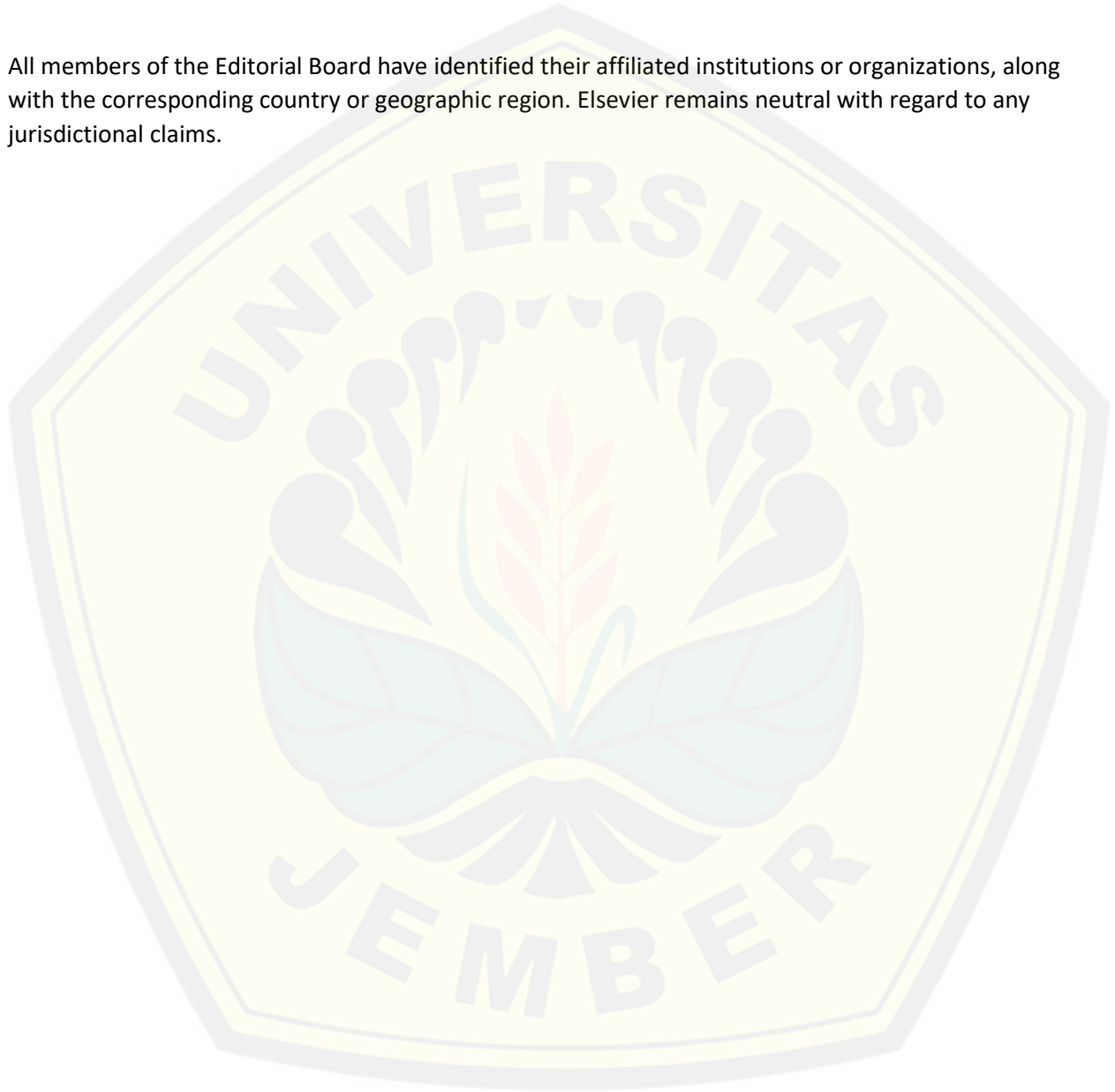


Table of contents

Case report

Colonic atresia with modified Santulli procedure

Henggar Allest Pratama, Supangat

Article 101473

Case report

Contained gallbladder perforation due to typhoid fever managed without operation or drainage

Tharmini Danisious, Thushara Kudagammana, Heshan Jayaweera, Sinnarajah Krishnapradeep, ...  
Mathula Hettiarachchi

Article 101438

Case report

Bogotá bag for pediatric Open Abdomen

Vito Briganti, Stefano Tursini, Caterina Gulia, Giovanni Ruggeri, ... Mario Lima

Article 101471

Case report

Acute inflammation of gastric duplication cyst in a toddler

Alshaima Alghamdi, Maher Alzaiem

Article 101470

Case report

Ectopic scrotum: Single stage rotational flap reconstruction with orchidopexy

Rashmi R. Singh, Ruth L. Seager, Mohamed Shibu, Devesh Misra, Ashwini Joshi

Article 101469

Case report

Atypical presentations of ectopic pancreatic tissue

P.S. Sulser, S. Azarhoush, D.C. Aronson, S.J. Tharakan, ... U. Moehrlen

Article 101450

Case report

Undifferentiated duodenal sarcoma with rhabdoid features

Parag J. Karkera, Pradnya S. Bendre

Article 101451

Case report

Delayed presentation of traumatic hepatic pseudoaneurysm in a child

Tristan Anderson, Lauren Styan, Craig McBride, Muddassir Rashid

Article 101452

Case report

Bilateral chest wall mesenchymal hamartoma: Prenatal diagnosis and staged surgical resection

Stephanie Groth, Stephanie Eyerly-Webb, Lisa LaForest, Eric Dion, ... Joseph Lillegard

Article 101474

Case report

Metastatic pulmonary sarcomatoid carcinoma presenting in an infant

Sarah C. Stokes, Abd-elrahman S. Hassan, Payam Saadai, Lisa P. Abramson

Article 101437

Short communication

Intra-cerebral hemorrhage associated with choledochal cyst in an infant

Syed Waqas Ali, Nida Manzoor, M. Sajjad Ashraf, Fehmina Arif, Muhammad Arif Mateen Khan

Article 101373



Case report

Excision of bilateral pheochromocytomas followed by staged resection of neuroendocrine carcinoma of the pancreas

Sandesh V. Parelkar, Rujuta S. Shah, Sanjay N. Oak, Beejal V. Sanghvi, ... K.K. Khidtta

Article 101463

Case report

Newborn with incarcerated inguinal hernia and complete androgen insensitivity syndrome

Giulia Mottadelli, Elisa Zambaiti, Laura Guazzarotti, Calogero Virgone, Piergiorgio Gamba

Article 101476

Case report

Lipiodol lymphangiography in a very low birth weight premature infant

Mitsuhiro Haga, Motoi Kato, Masami Kanno, Masaki Shimizu, Shoji Watanabe

Article 101480

Case report

Robot-assisted splenectomy in a teenager with chronic autoimmune thrombocytopenia

Silvia Bisoffi, Costanza Tognon, Laura Sainati, Antonio Marzollo, ... Piergiorgio Gamba

Article 101477

Case report

Desmoplastic small round cell tumor presenting as an inguinal mass in a 2-year old boy

Emma Kruger, Patience Obasaju, Emily Dunn, Jeffrey Lukish, ... Daniel S. Rhee

Article 101479

Case report

Atypical presentation of concurrent duodenal web and malrotation

Sajad Ahmad Wani, Kumar Abdul Rashid, Kartic Saxena, Mahim Khan

Article 101443

Case report

Intubation precautions in a pediatric patient with severe COVID-19

Robert Shaw, Nathaniel Tighe, Kirsten C. Odegard, Peta Alexander, ... Koichi Yuki

Article 101495





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## Colonic atresia with modified Santulli procedure

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## ABSTRACT

Colonic atresia is one of the rarest congenital intestinal atresia. The incidence is estimated between 1:40,000 to 1:66,000 live births. The clinical manifestation of colonic atresia is abdominal distension in 24–48 hours after birth progressively, failure to pass meconium, and feculent vomiting as late manifestation. Colonic atresia need to receive surgical treatment as soon as possible. The surgical technique to treat colonic atresia could be different one each another based on patient condition and operator's experience. We describe a case of colonic atresia that was performed a modified Santulli procedure. As the result, patient could perform defecation from anus with minimal production of stoma and no post-operative complication. In conclusion, this technique has some advantages and could be one of surgical technique to treat colonic atresia.

## 1. Introduction

Colonic atresia is one of the rarest diseases of congenital intestinal atresia. It was 1.8%–15% of all congenital intestinal atresia. The incidence is estimated between 1:40,000 to 1:66,000 live births [1]. It must be suspected a colonic atresia if infant have failure to pass meconium in the first 24 hours after birth. It usually only pass little or no fecal matter. It followed by abdominal distension in 24–48 hours after birth progressively. Vomiting may be present in late, with feculent vomiting is a late manifestation of colonic atresia [2]. From radiology examination, intestinal loop dilatation could be finding multiple with or without pneumoperitonium which is a sign of proximal colon perforation. Air fluid level is present in 70% of colonic atresia [3]. (see Figs. 1–5)

Operative management of colonic atresia should be done as soon as possible. Primary anastomotic or colostomy is the options of the operative management, depend of the type and site of atresia. Various surgical techniques could be performing based of patient condition and operator experience [4]. We describe a case of colonic atresia that was performed a modified Santulli technique. It was one of the surgical techniques to treat colonic atresia.

## 2. Case report

A 2 days year old male baby, born by normal labor to a gravida 1 para 0 abortus 0, 39 gestational weeks, was taken to Emergency Department Soebandi Hospital. APGAR score was 8–9 and the baby's birth weight was 3000 g. The patient came with abdominal distension and vomiting. Only a little fecal material was pass form the anus without meconium. During pregnancy, there is no anomaly found from ultrasound.

In the emergency room we found abdomen distension with sign of dehydration. The anal hole was present and no abnormality found from genitalia examination. From physical examination we didn't found other congenital abnormality. Radiology examination showed a bowel dilatation at proximal segment that lead to diagnose the atresia (Fig. 1).

Fluid resuscitation and nasogastric tube decompression was performing followed by broad spectrum antibiotics. Then the patient planned to a cito laparotomy exploration. During the operation we found a colonic atresia type III in ascending colon with discrepancy between proximal and distal was 1:10. There is no perforation on the proximal part (Figs. 2 and 3).

Then we perform a modified Santulli procedure. Initially we connect the side of proximal part and the side of distal part to make an

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**Fig. 1.** The Patient's X Ray. We can see a bowel dilatation at proximal segment without air fluid level.



**Fig. 2.** Type III Colonic atresia. We can see the proximal part of atresia (ileum) is dilatated.

anastomotic. Then we make an ileostomy from the proximal end (Fig. 4).

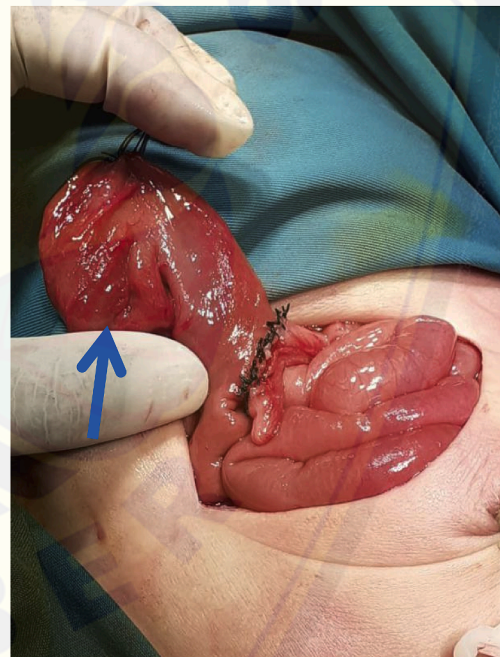
The result was good. There is no post-operative complication. Patient could perform defecation from anus very well with minimal production from stoma.

### 3. Discussion

Colonic atresia is not easily diagnosed preoperatively. Patient may come to emergency room with abdominal distension and absence of meconium pass. Plain abdominal x ray can showed finding of dilatation of bowel and could be accompanied by air fluid level and pneumoperitoneum. Barium enema can show distal atretic segment and



**Fig. 3.** The distal part of atresia. We can see the discrepancy between proximal and distal part.



**Fig. 4.** A side to side anastomotic with a stoma from proximal colon (blue arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

microcolon. Any patient with intestinal obstruction's sign should have decompression with nasogastric tube and resuscitation with intravenous fluid. Prophylaxis with broad spectrum antibiotics also should be administered before operative management [5].

Surgical operation must be done as soon as possible. The most common type is type III (90%) and 38% at the right colon [6]. In colonic atresia (and other intestinal atresia), the purpose is decompression of proximal colon and to avoid the complication such as volvulus and perforation. Operation should be done in less than 72 hours of life. The mortality of colonic atresia is higher when the oper-

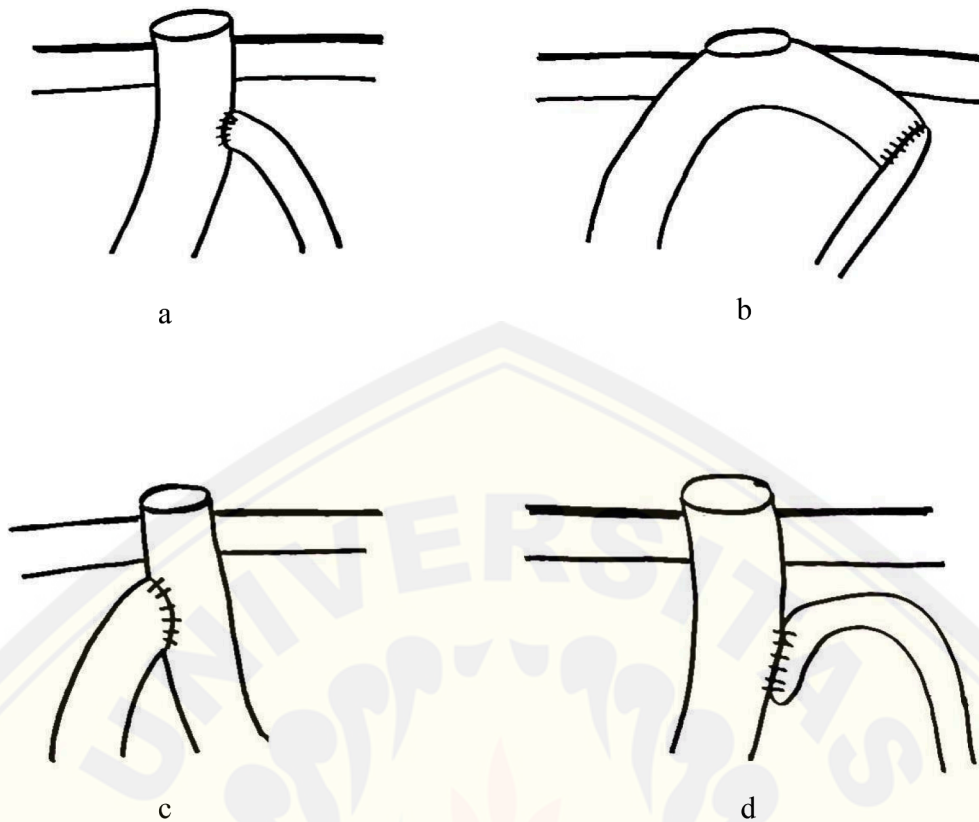


Fig. 5. a) Santulli procedure [13] b) Bischoff's method [14] c) Bishop-Koop procedure [15] d) Modified Santulli procedure.

ation is done in 72 hours of life or more (45%) than less than 72 hours of life (20%) [7].

At early 1958, an initial end colostomy is the only procedure to treat colonic atresia. Then it will follow by anastomotic in the next procedure [8]. At the 1977 until 1998, Karnak et al. found that there was a variation to make a primary anastomotic in 17% patients of colonic atresia [9]. Primary anastomotic procedure has the advantage that the distal intestine will become more functional because it can be passed by food so it will reduce discrepancy between proximal and distal part of the colon. It also has the advantage to prevent complication of stoma. But, primary anastomotic have a risk. Colonic Atresia Hirschsprung's Disease Association (CAHDA) could cause a failure of primary anastomotic [11]. Many paediatrics surgeon distinguish between the management of colonic atresia depend on this location. The most common use is primary resection and anastomotic at the proximal splenic flexure atresia and primary colostomy at the distal splenic flexure atresia [10]. In the colonic atresia located at proximal ascending colon, primary anastomotic has a good outcome [11].

Over the year, the surgical technique to treat colonic atresia has been modified with several techniques. The novel approach of surgical technique to decompress the proximal part and at the same time enable the distal part to reduce discrepancy was Ostomy in Continuity (OIC) procedure. Santulli procedure was one of the surgical techniques to perform OIC. Santulli procedure describe as an anastomotic of the side of proximal part to end of distal bowel segment and make an end ostomy at proximal end. The mechanism is decompressing the proximal part and allows the distal part to enlarge [13]. The next surgical technique to perform OIC was Bischoff's method and Bishop-Koop procedure. Bischoff's method is decompressing the proximal part by a side ostomy and keep maintains the continuity of bowel movement by an end to side anastomotic [14]. Meanwhile, Bishop-Koop procedure involve an anastomotic of the end of proximal part to side of distal part and make an ostomy by exteorization of the end of distal part. This mechanism is decompressing the proximal part, maintains

the continuity of intestinal tract, and retains the distal end stoma to treatment or inspection [15].

Based on it, we try to combine the advantage of primary anastomotic but at the same time we prevent the risk of anastomotic failure with ileostomy. So we take a modified Santulli procedure. Primary anastomotic was done with a side to side anastomotic technique. A side to side anastomotic technique was chosen to increase the diameter of the tunnel and to treat the large discrepancy (greater than 1:5). Ileostomy was made at the proximal end to prevent inadequate distal part of atresia(Fig. 5).

This technique has a good outcome. The distal atresia was adequate to evacuate the meconium and feces. It also support a good outcome of primary anastomotic of colonic atresia located at proximal ascending colon. Stoma production was little but it was important to prevent if the anastomotic was inadequate. After that, the next surgery procedure to colostomy closure was more hopeful to success.

#### 4. Conclusion

Colonic atresia's surgical treatment is a challenging procedure. There were some modification techniques that develop over the years. In this colonic atresia case, we perform a side to side anastomotic with colostomy technique and have a good result. This technique could be a new technique to combine the advantages of primary anastomotic but at the same time prevent the risk of failure.

#### Patient consent

An informed consent was obtained from patient's parents for publication.

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### Authorship

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

### Declaration of competing interest

The following authors have no financial disclosures (HAP, S).

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