

# Spectrum of small intestinal lesions in surgically resected specimens in children below 12 years – a five years retrospective study

Dr Vitthal Kendre<sup>1</sup>, Dr Pragati Sathe<sup>2</sup>

<sup>1</sup>Resident Pathology, Department of Pathology Hospital, Mumba-400012,

<sup>2</sup>Associate Professor, Department of Pathology, KEM Hospital, Mumbai- 400012.

Author for correspondence: Dr Vitthal Kendre, Department of Pathology, ESI-PGIMS Hospital, Andheri, Mumbai- 400093.

---

## Abstract:

**Background:** Such studies have been conducted on small intestinal lesions in adults in the Indian population. Similar studies in pediatric age group demonstrating such a wide spectrum of lesions are very few. Some lesions are asymptomatic while some cause severe colicky abdominal pain and bleeding per rectum. However, some of them require an urgent surgical management. **Material and Methods:** This is a retrospective study of surgically resected small intestinal lesions received in the surgical pathology laboratory over a 5-year period (from January 2013 to December 2017). We received 96 cases of surgically resected small intestinal lesions in children below 12 years of age. The clinical details, radiological findings & pathological findings (gross & microscopy) retrieved. The findings were tabulated and analysed. **Result:** Out of 1358 pediatric surgical specimens, surgically resected small intestinal specimens constituted 96 cases (7.04%). Of these, 55 were congenital lesions and 41 were acquired lesions. The congenital lesions received included cases of atresia (22 cases, 22.91%), diverticuli (18 cases, 18.75%), intestinal web (7 cases, 7.29%), meconium lesions (1 case, 1.04%), duplication cysts (5 cases, 5.20%) and a case of malrotation (1 case, 1.04%). The acquired lesions included inflammatory lesions (18 cases, 18.75%), intussusception (8 cases, 8.33%), ischemic bowel disease and vascular lesions (7 cases, 7.29%), neoplasms (3 cases, 3.125%) and stoma site resections (5 cases, 5.20%). **Conclusion:** This study indicates that a wide variety of lesions congenital as well as acquired arise in various parts of small intestine particularly the ileum. Congenital small intestinal lesions outnumber the acquired lesions in pediatric population below 12 years. Vomiting and abdominal pain are nonspecific symptoms which can be produced by any lesion and thus need thorough investigation to identify the cause. Certain lesions like atresia and meconium lesions may be an indication of systemic disease like multiple extraintestinal anomalies and cystic fibrosis respectively, thus requiring workup for the same.

**Key Words:** Atresia, Meckel's diverticulum, duplication cyst, intussusception.

---

Date of Submission: 15-06-2022

Date of Acceptance: 30-06-2022

---

## I. Introduction

The small intestinal lesions in pediatric age group can be classified as congenital lesions and acquired lesions. Lesions requiring surgical resection can have variety of etiologies like atresia, duplications, diverticuli, intussusceptions, polyps and neoplasms both benign and malignant. Majority of them are symptomatic while some of them may be detected when exploratory laparotomy is performed for other reasons. Some of them can be managed medically for a while and can be surgically excised after an interval. However, some of them require an urgent surgical management.

Some lesions cause severe colicky abdominal pain and bleeding per rectum (e.g. intussusception, Meckel's diverticulum), some lesions present with deep chronic nonspecific pain (e.g. gastrointestinal lymphomas) or as a mass (e.g. lymphangiomas, gastrointestinal stromal tumors) while some of them manifest with life threatening events like perforation. The manifestations of intestinal obstruction vary with the cause, level of obstruction and time between obstructing events and patient's evaluation. High obstructions (e.g. duodenal and jejunal atresia, malrotation, volvulus of midgut) present with bilious vomiting, abdominal distension while distal obstruction (e.g. ileal atresia, meconium ileus etc.) presents with obstipation, abdominal distension.

The present study was conducted to study the spectrum of surgically resected small intestinal lesions in children.

**Aims and Objectives**

- 1.To study the spectrum of surgically resected small intestinal lesions in children (from newborn up to 12 years).
- 2.To study the cases with respect to the clinical features, laboratory investigations, radiological findings and pathological features by obtaining the data from records.
- 3.To compare our data with the literature available on small intestinal lesions with respect to incidence, age and gender distribution, clinical presentation, laboratory findings and pathologic features.

**II. Materials and Methods**

This is a retrospective study of surgically resected small intestinal lesions received in the surgical pathology laboratory over a 5-year period (from January 2013 to December 2017).

**Selection criteria-**

- All surgically excised small intestinal lesions received during the study period will be included.

**Exclusion Criteria –**

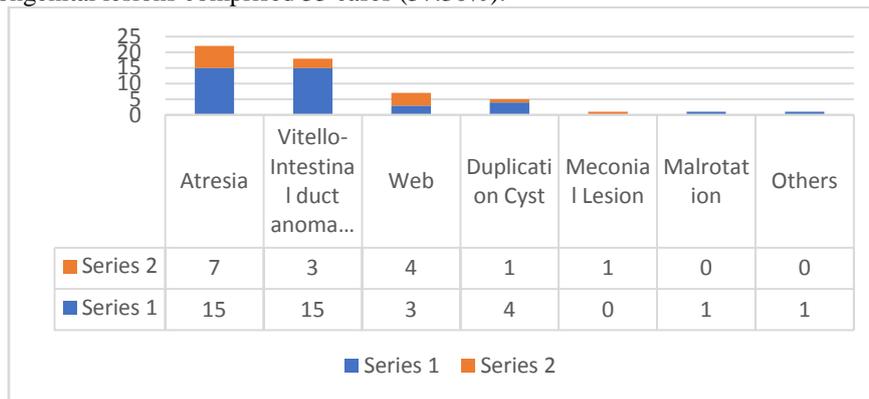
- Small intestinal biopsies performed for medical causes and where surgical management is not indicated will be excluded from the study.
- Clinical details of the patients with respect to age, gender, clinical features, laboratory investigations and radiological findings will be obtained from the indoor charts.
- Pathologic findings (gross and microscopy) will be retrieved from the department records. Slides stained by H & E will be reviewed wherever necessary. Immunohistochemistry will be performed on the paraffin tissue blocks wherever required. Statistical analysis will be applied wherever required (PASW Method)

**III. Results:**

We received 96 cases of surgically resected small intestinal lesions in children below 12 years of age during the study period from January 2012 to December 2016 (we received 1358 pediatric surgical cases during this period). So surgically resected small intestinal lesions in children below 12 years comprised of 7.06% (96 cases out of 1358 cases) of total pediatric surgical cases. Out of these 55 were congenital (57.30%) lesions and the remaining 41 were acquired (42.70%) lesions.

**Congenital Lesions:**

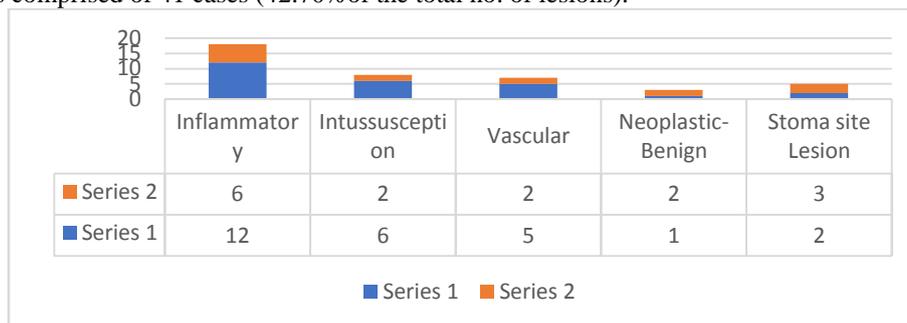
In our study, congenital lesions comprised 55 cases (57.30%).



**Fig 1: congenital lesions [Blue - Male Orange – Female]**

**Acquired lesions**

These lesions comprised of 41 cases (42.70% of the total no. of lesions).



**Fig 2: Acquired lesions [Blue – Male, Orange- Female]**

**Table 1: Location wise small intestinal lesion in children below 12 years**

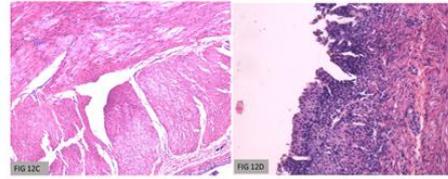
LESIONS CONGENITAL	LOCATION OF OCCURRENCE				
	Ileum	Jejunum	Duodenum	Small Intestine	Meckel's Lesions
1)Atresia	10	11	01	00	00
2)Diverticulum	10	00	00	04	04
3)Web	00	03	04	00	00
4)Meconial Lesions	01	00	00	00	00
5)Duplication Cysts	02	03	00	00	00
6)Malrotation	00	01	00	00	00
7)Other	01	00	00	00	00
<b>TOTAL</b>	<b>24</b>	<b>18</b>	<b>05</b>	<b>04</b>	<b>04</b>
<b>ACQUIRED Lesions</b>					
1)Inflammatory	11	04	00	03	00
2)Ischemic bowel disease & Vascular lesions	05	01	00	01	00
3)Intussusception	07	01	00	00	00
4)Neoplastic-Benign	01	02	00	00	00
5)Others	04	01	00	00	00
<b>TOTAL</b>	<b>28</b>	<b>09</b>	<b>00</b>	<b>04</b>	<b>00</b>

**Table 2: Age wise distribution of cases (n=96)**

Lesions CONGENITAL	No.	Age of occurrence			
		Up to 1 month	1 month - 1 year	1 year - 5 year	5 year - 12 year
1)Atresia	22	22	00	00	00
2) Vitello-intestinal Duct Anomalies (Including Meckel's diverticulum)	18	05	01	04	08
3)Web	7	04	02	01	00
4)Meconium Lesions	1	01	00	00	00
5)Duplication Cysts	5	03	01	01	00
6)Malrotation	1	00	01	00	00
7)Other	1	00	00	00	01
<b>TOTAL</b>	<b>55</b>	<b>35</b>	<b>05</b>	<b>06</b>	<b>09</b>
<b>ACQUIRED</b>					
1)Inflammatory	18	06	04	04	04
2)Intussusception	08	00	06	00	02
3)Ischemic bowel disease & Vascular lesions	07	02	02	02	01
4)Neoplastic-Benign	03	00	00	01	02
6)Others-Stoma Site	05	01	01	01	02
<b>TOTAL</b>	<b>41</b>	<b>09</b>	<b>13</b>	<b>08</b>	<b>11</b>



**Fig 5 (A,B)** – External aspect and cut surface of Duplication cysts. The wall is thick and glistening.



**FIG 12C**

**FIG 12D**

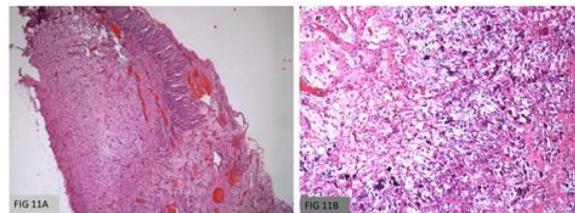
DUPLICATION CYST.

Fig 12C (H&E, 100X): The wall is thick and has muscularis externa along with myenteric plexus in between.

Fig 12D (H&E, 100X): Squamous epithelium lining a part of the cyst wall.



**Fig 4 – ILEAL ATRESIA** : Portion of the intestine proximal to the narrowing shows dilatation and gangrenous changes



**FIG 11A**

**FIG 11B**

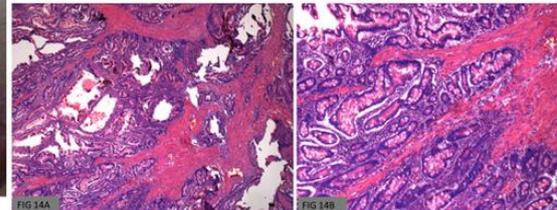
**Intestinal atresia with meconium peritonitis**– Fig 11A(H&E, 40X) & Fig 11B(H&E, 100X) : Shows meconium, macrophages and abundant calcification.



**FIG 10 A**

**FIG 10 B**

**Fig 10 (A,B)** – A case of Peutz-Jegher Polyp- showing lobulated pedunculated pinkish polyp with a thick stalk.



**FIG 14A**

**FIG 14B**

**Peutz-Jegher Polyp** - Fig 14A (H&E, 40X) & Fig 14B (H&E, 100X): Shows a polyp with a stalk of branching muscularis mucosae, the fibres reaching up to the mucosa.



**FIG 6 A**

**FIG 6 B**

**Fig 6 (A,B)** – Meckel's diverticulum with exomphalos: Note the edematous umbilical cord and the thin transparent membrane like tissue (→ ARROW)

#### IV. Discussion:

We received 96 cases of surgically resected small intestinal lesions comprising 7.06% of total pediatric surgical cases. The lesions comprised of 55 congenital lesions (57.30%) and 41 acquired lesions (42.70%).

##### Congenital Lesions:

a) **Atresia:** In our study, the atretic lesions were more common in males, in the jejunum and occurred in first week of life. Similar findings were observed in the study of 39 cases by **Subbarayan D and et al (2015)**, the male preponderance and majority cases occurring in the first week of life.<sup>[2]</sup> However, the commonest location was seen in the ileum as opposed to the jejunum in our study.

b) **Diverticulum:** - In our study also the vitello-intestinal duct anomalies comprised 18.5% of total cases and Meckel's diverticulum was the commonest anomaly comprising 16 cases. As found in other studies by **Lin X et al (2017)**, **Quarrie R et al (2014)** and **Sagar et al (2006)**, it was more common in ileum (n=10, 55.5%).<sup>[7,10,61]</sup> The commonest age group was 5years - 12years (n=8,44.4%), with mean age of occurrence being 7.75 years while the patients were slightly younger in the study by **Quarrie R et al (2014)**.<sup>[7]</sup>

c) **Duplication cysts:** - In our study, the duplication cysts lesions were more common in males (male to female ratio, 4:1) and age of occurrence was predominantly in first month (n=3, 60%). The duplication cysts were more common in jejunum (n=3, 60%) than ileum (n=2, 40%). The age of occurrence matched with that found in the study of 17 patients by **Rattan KN et al (2017)** and **Sharma et al**.<sup>[14,63]</sup> However, in both studies, the authors found maximum cysts in the ileum as opposed to jejunum in our study.

##### Acquired Lesions

a) **Inflammatory Lesions:** In our study we had 18 cases of inflammatory lesions (18.75%). These lesions were more common in males (n=12, 66.7%) than females (n=6, 33.3%) with male to female ratio of 2:1. Inflammatory lesions occurred predominantly in first month of life (n=6, 33.3%) and were located in ileum mainly (n=11, 61.1%). A study by **Uppuluri et al (2010)**, in a retrospective study of 84 patients in whom a histological diagnosis of abdominal TB was confirmed at laparotomy,<sup>[28,29]</sup> 18 (21.4%) were in the pediatric age group (youngest 7 months) like our study.

b) **Intussusception:** In our study, the intussusception lesions were more common in males (male to female ratio, 3:1). These lesions occurred in age group of 1month to 1 year with an average of occurrence being 7 months. In our study, these lesions were located mainly in the ileum i.e. 87.5% (n=7 cases). The study by **Navarro O M et al (2004)** included 163 children (100 boys, 63 girls) shows mean age of 24 months.

c) **Ischemic bowel disease and Vascular Lesions:** In our study, the vascular lesions were more common in males (male to female ratio, 2.5:1). These lesions occurred evenly in age groups of 0 -1month, 1 month-1 year and 1 year-5years (i.e. n=2 cases), that means these lesions occurred predominantly before 5 years (85.8%). The study by **Lin Y and et al (2011)**, had total of 49 children with small bowel volvulus (SBV), including 35 boys and 14 girls, with an average age of 22 months (range 1 day-14 years).

d) **Neoplastic Lesions:** In our study, we received total three neoplastic lesions, out of which 100% were benign (n=3 cases). These benign cases were more common in females (male to female ratio, 1:2). These benign lesions occurred more in the age group of, 5 years -12 years i.e. 66.7% (n= 2 cases). These lesions occurred more in the jejunum, 66.7% (n=2 cases).

#### V. Conclusion:

- This study indicates that a wide variety of lesions congenital as well as acquired arise in various parts of small intestine particularly the ileum.
- Congenital small intestinal lesions outnumber the acquired lesions in pediatric population below 12 years.
- Vomiting and abdominal pain are nonspecific symptoms which can be produced by any lesion and thus need thorough investigation to identify the cause.
- Certain lesions like atresia and meconium lesions may be an indication of systemic disease like multiple extraintestinal anomalies and cystic fibrosis respectively, thus requiring workup for the same.

#### Bibliography

- [1]. John H, Rebecca W, Christopher R W. The Gastrointestinal Tract. In: Stocker J T, Dehner L P, editors. Pediatric Pathology. 4<sup>th</sup> edition. Wolters Kluwer;2016.922-1071.
- [2]. Subbarayan D, Singh M, Khurana N, Sathish A. Histomorphological Features of Intestinal Atresia and its Clinical Correlation. J Clin Diagn Res. 2015; 9: 26-29.
- [3]. Suchitha S, Kumarguru B, Sunila, Manjunath G. Neonatal Intramural Calcification in Jejunal Atresia: Case Report of a Rare Phenomenon. International Journal of Applied and Basic Medical Research. 2017; 7:258-60.
- [4]. Choudhry MS, Rahman N, Boyd P. Pediatr Surg Int 2009;25: 727.
- [5]. Rattan KN, Singh J, Dalal P, Rattan A. Meckel's diverticulum in children: Our 12-year experience. African Journal of Pediatric Surgery; 2016; 13:170-74.
- [6]. Sinha S, Sarin Y, Ramji S. Ileal atresia with duplication cyst of terminal ileum: A rare association. J Neonatal Surg. 2012; 1:27.

- [7]. Quarrie R, Lindsey D, Bahner DP. Review of the incidence and management of Meckel's diverticulum. *Austin J Surg.* 2014; 1:1015.
- [8]. Mittal BR, Kashyap B, Bhattacharya A, Singh B, Radotra BD, Lakshmi K, et al. Meckel's diverticulum in infants and children; technetium-99m pertechnetate scintigraphy and clinical findings. *Hell, J Nucl Med.* 2011; 11:26–9.
- [9]. Park JJ, Wolff BG, Tollefson MK, Walsh EE, Larson DR. Meckel diverticulum: The Mayo Clinic experience with 1476 patients (1950-2002) *Ann Surg.* 2005; 241:529–33.
- [10]. Lin X, Huang X, Bao X, Zheng N, Xia Q, Chen C. Clinical characteristics of Meckel diverticulum in children: A retrospective review of a 15-year single-center experience. *Medicine.* 2017;96: e7760.
- [11]. Lin HH, Lee HC, Yeung CY. Congenital webs of the gastrointestinal tract: 20 years of experience from a pediatric care teaching hospital in Taiwan. *PediatrNeonatal.* 2012; 53:12-7.
- [12]. Melek M, Edirne YE. Two cases of duodenal obstruction due to a congenital web. *World J Gastroenterol.* 2008; 14: 1305–07
- [13]. Nissan, A, Seror D, Udassin R. Gastric outlet obstruction caused by prepyloric mucosal diaphragm mimicking duodenal ulcer: a case report. *Acta Paediatr.* 1997; 86: 116–18.
- [14]. Rattan KN, Bansal S, Dhamija A. Gastrointestinal Duplication Presenting as Neonatal Intestinal Obstruction: An Experience of 15 Years at Tertiary Care Centre. *Journal of Neonatal Surgery.* 2017; 6:5.
- [15]. Stern LE, Warner BW. Gastrointestinal duplications. *SeminPediatr Surg.* 2000; 9:135-40.
- [16]. Boczar M, Sawicka E, Zybert K. *Dev Period Med.* 2015; 19:32-40.
- [17]. Munck A, Gerardin M, Alberti C, Anzenmen C. Clinical outcome of cystic fibrosis presenting with or without meconium ileus: a matched cohort study. *J Pediatr Surg* 2006; 41 1556-60.
- [18]. Paradiso VF, Briganti V, Oriolo L, Coletta R, Calisti A. Meconium obstruction in absence of cystic fibrosis in low birth weight infant: an emerging challenge from increasing survival. *Ital J Pediatr.* 2011;14; 37:55.
- [19]. Nam SH, Kim SC, Kim DY, Kim AR, Kim KS, Pi SY, et al: Experience with meconium peritonitis. *J Pediatr Surg* 2007; 42:1822-25.

Dr Vitthal Kendre, et. al. “Spectrum of small intestinal lesions in surgically resected specimens in children below 12 years – a five years retrospective study.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(06), 2022, pp. 60-65.