

## Original Research Article

# Profile of Hirschsprung's disease cases diagnosed in tertiary care teaching hospital: a retrospective observational study

S. Prabakaran<sup>1\*</sup>, K. Kasthuri Thilagam<sup>2</sup>

<sup>1</sup>Department of Paediatric Surgery, Government K.A.P. Viswanatham Medical College, Trichi, Tamil Nadu, India

<sup>2</sup>Department of Pathology, Government Mohan Kumara Mangalam Medical College and Hospital, Salem, Tamil Nadu, India

**Received:** 29 October 2019

**Revised:** 21 November 2019

**Accepted:** 06 December 2019

**\*Correspondence:**

Dr. S. Prabakaran,

E-mail: [paedprabakaran@gmail.com](mailto:paedprabakaran@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** To date, there are very few studies of Hirschsprung's disease. Hence, the study was conducted to profile Hirschsprung's disease in a tertiary care setting.

**Methods:** This is a retrospective observational study that evaluated the admitted patients with Hirschsprung's disease in the pediatric surgery department. Biopsy was taken from the patient in the form of the full thickness of intestine, seromuscular biopsy, resection from the colostomy site when doing closure and or appendix was taken and subjected to histopathological study with routine eosin and haematoxylin stain.

**Results:** Among the study population, 21(28.8%) children were aged less than one month, and only 10(13.7%) were aged 11 years and above. There were 45(61.6%) participants were male and 28(38.4%) female. Most common biopsy site was appendix in 33(46.2%), followed by Ileum full-thickness biopsy in 6(8.2%) , Ileum Seromuscular biopsy in 5(6.8%) ,Colon full-thickness biopsy in 4(5.6%) subjects. Among the 73 participants, 46(63%) were clinically suspected cases, and the remaining 27(36.9%) were clinically established cases. Among clinically suspected, the majority (50.7%) had ganglionic cells only in proximal segments.

**Conclusions:** the Hirschsprung's disease diagnosis was established mostly in younger males.

**Keywords:** Case series, Clinical profiling, Epidemiology, Hirschsprung's disease

### INTRODUCTION

Hirschsprung's disease is a developmental defect of the enteric nervous system.<sup>1</sup> It is one of the frequent causes of intestinal obstruction in newborns, secondary to gut motility disorder. It has features of complex genetic heterogeneous disorder with variable inheritance. Hirschsprung's disease occurs as an isolated phenotype in the majority (70%) cases. In some cases, it could be related to some syndromes such as Down's syndrome, Waardenburg syndrome, Fryns syndrome, and cartilage-

hair hypoplasia syndrome. About one infant out of every 5000 is known to be born with Hirschsprung's disease (HD).<sup>2,3</sup> The rarity of adult HD is attributed to the condition being diagnosed in infancy or early childhood.<sup>4</sup> Rosin documented the first case of adult HD in the 1950s.<sup>2,5,6</sup> The term "adult HD" is used for patients presenting after ten years of age.<sup>2,3,7</sup>

Approximately 94% of cases of the disease are diagnosed before the age of 5 years and only 5% are diagnosed in adulthood.<sup>2-4,6</sup> Up until now, approximately 550 cases of

adult HD have been reported, making this disease a major cause of chronic refractory constipation in adults.<sup>2,4</sup>

In adults, the disease is of less severity, so it is taken for granted and is usually misdiagnosed or remains unrecognized until complications occur in the form of faecal retention and/or intestinal obstruction.<sup>8</sup> So, for an accurate diagnosis of HD in adults, a high index of suspicion is needed.<sup>2</sup>

The diagnosis of Hirschsprung's disease is based on a combination of clinical features, the radiological appearance of the bowel and histological features in Haematoxylin and Eosin stained sections of intestinal biopsies. Calretinin Immunohistochemistry is emerging to be one of the newer methods. Calretinin immunohistochemistry holds several advantages, as it's unambiguous and straightforward; and it is either positive or negative.

Without an early screening and diagnosis, some patients develop serious complications, such as toxic megacolon or acute enterocolitis. Since more than 90% of cases present in the childhood and neonatal period, it is imperative to know the epidemiology and early management of Hirschsprung's disease.

This retrospective case series was done to profile the Hirschsprung's disease in a tertiary care setting.

## METHODS

This is a retrospective observational study conducted in the pediatric surgery department of a tertiary care hospital. Study population included children diagnosed with Hirschsprung's disease in the study setting during the study period. The time frame of the study was between March 2019 to August 2019, i.e. for a period of six months.

### Inclusion criteria

- All live-born infants aged up to 6 months of age
- Diagnosed with HD by biopsy
- Both boys and girls

### Exclusion criteria

- Only probable cases, refused to undergo biopsy
- Children aged more than 6 months

### Study procedure

Case records of all the children with symptoms suggestive of Hirschsprung's disease were retrieved. Case records with other probable aetiologies or uncertain final diagnosis were excluded from the final analysis. The detailed demographic, clinical and biopsy related parameters were recorded in a structured proforma.

As per the institutional protocol, all the children with suspected Hirschsprung's disease have undergone biopsy of one or more of the following sites.

- Full thickness of intestine
- Seromuscular biopsy of intestine
- Resection from the colostomy site when doing closure
- Appendix

All the collected biopsy samples were transported under appropriate transport condition to the laboratory. All the specimens were subjected to histopathological study with routine eosin and hematoxylin stain. Presence or absence of ganglion cells and the condition of them were the predominant features noted.

### Statistical analyses

Descriptive statistics were used to describe the basic demographics, biopsy type and ganglionic cell types. The data were presented in terms of number and percentage. Since the study had not tested any hypothesis, no statistical test of significance was used. IBM SPSS version 21 was used for data analysis.

## RESULTS

Among the study population, 21(28.8%) children were aged less than 1 month, 4(5.5%) were aged between 1 to 12 months, 19(26%) were aged between 1 to 5 years and 6 to 10 years, 10(13.7%) were aged 11 years and above. Among the study population, 45(61.6%) were participants male and remaining 28(38.4%) participants were female (Table 1).

**Table 1: Age and gender distribution of the study population (N=73).**

Age in years	Frequency	Percentage
< 1 month	21	28.8%
1 to 12 months	4	5.5%
1 year to 5 years	19	26.0%
6 years to 10 years	19	26.0%
Above 11	10	13.7%
Gender		
Male	45	61.6%
Female	28	38.4%

Most common biopsy site was appendix in 33(46.2%), followed by Ileum full -thickness biopsy in 6(8.2%) , Ileum Seromuscular biopsy in 5(6.8%) , Colon full -thickness biopsy in 4(5.6%) subjects. (Table 2).

Among the 73, 46(63%) were clinically suspected cases, and the remaining 27(36.9%) were clinically established cases. Among clinically suspected, the majority (50.7%) had ganglionic cells only in proximal segments.

Remaining 9(12.3%) had no ganglionic cells in any of the biopsy specimens (Table 3).

**Table 2: Descriptive analysis of biopsy type in the study population (N=73).**

Biopsy type	Frequency	Percentages
Appendix	33	46.2%
Ileum full-thickness biopsy	6	8.2%
Ileum seromuscular biopsy	5	6.8%
Colon full-thickness biopsy	4	5.6%
Sigmoid colon submucosal resection of colon	3	4.2%
Rectum full-thickness biopsy	3	4.2%
Colostomy closure site full-thickness biopsy	2	2.8%
The colostomy is done with a full-thickness biopsy	2	2.8%
Ileum perforation resected specimen	2	2.7%
Transverse colon full-thickness biopsy	2	2.7%
Appendix and rectum biopsy full-thickness biopsy	1	1.4%
Caecum full thickness	1	1.4%
Colon seromuscular biopsy	1	1.4%
Duhamels pull-through procedure with seromuscular biopsy	1	1.4%
Intestinal obstruction with gangrene small intestine resection	1	1.4%
Sigmoid colostomy is done with a full-thickness biopsy	1	1.4%
Ileal atresia ileal resection and appendix	1	1.4%
Ileostomy closure site full-thickness biopsy	1	1.4%
Jejune seromuscular biopsy	1	1.4%
Megacolon colon resection	1	1.4%
Rectum seromuscular biopsy	1	1.4%

**Table 3: Descriptive analysis of ganglion cells in the study population (N=73).**

Ganglion cells	Frequency	Percentages
Clinically suspected		
Ganglion cells not seen in distal specimen biopsy but cells seen in proximal segments	37	50.7%
Ganglion cells not seen in all biopsy	9	12.3%
Clinically established		
Ganglion cells not seen all biopsy	17	23.3%
Very few degenerated ganglion cells seen all biopsy	6	8.2%
Fewer normal ganglion cells seen in proximal biopsy only absent in distal biopsy	2	2.7%
Very few degenerated ganglion cells seen in proximal biopsy only absent in distal biopsy	1	1.4%
Ganglion cells not seen in distal and proximal segments seen only in colostomy closure site	1	1.4%

## DISCUSSION

Hirschsprung's Disease (HD) is a congenital disease with a rare occurrence. It is mostly diagnosed and treated during the neonatal period of one's life, and hence its occurrence in adults is very rare.<sup>2</sup> when HD is not diagnosed during early childhood, its diagnosis becomes difficult in adults and is often misdiagnosed as chronic constipation. The main characteristic of this disease is the absence of myenteric plexus parasympathetic ganglion cells in the distal bowel, causing functional obstruction of the intestine. Lack of ganglion cells is due to disturbance in the development of the enteric nervous system.<sup>2</sup> The treatment for HD is

surgical, where a ganglionic segment is excised and re-anastomosed with ganglionated bowel. Even with the availability of successful treatment options HD remains a challenging disease because of difficulty in its diagnosis in most of the cases. It is often confused with other congenital neurodysplastic conditions which also cause a functional obstruction in gastrointestinal tract.<sup>9</sup>

Rectum is involved in most of the cases (80%), and in very few cases longer segments of bowel might be included causing total colonic ganglioneuroblastoma which is observed only in 8-10% of cases. HD is missed during the early period of life in cases where the infants have

short bowel segment, and this will be presented later in life with symptoms like chronic constipation, malnutrition and failure to thrive.<sup>10</sup> HD is often misdiagnosed as chronic constipation in adults. HD must be considered for differential diagnosis in adults presenting with chronic constipation. Early diagnosis will help in decreasing morbidity and mortality associated with the disease.<sup>1</sup>

This retrospective observational study on HD cases diagnosed in a tertiary care teaching hospital was conducted to develop a profile for Hirschsprung's disease in Indian population based on insights about its incidence in different age groups and gender distribution and its diagnosis by biopsy. This profile will help in the diagnosis of HD in adults which is often missed.

In the study population, 28.8% were children aged less than one month, 5.5% were children aged between 1 to 12 months, 26% were aged between 1 to 5 years and 6 to 10 years, 13.7% were aged 11 years and above. Among the study population, 61.6% were male and the remaining 38.4% participants were female. In the study the incidence of HD is noted to be more in neonates, this finding is similar to that found in research by Duess et al, and another study by Bradnock T et al, in their study on HD incidence and anomalies in Ireland concluded that incidence of HD beyond neonatal stage is rare.<sup>11,12</sup>

The cases studied included more male patients which is also similar to that found in many studies on HD like a study by Granéli C et al, on Diagnosis, Symptoms, and Outcomes of Hirschsprung's Disease from the Perspective of Gender which showed the prevalence of HD to be in the ratio of 1:4 between females and males.<sup>13</sup>

All the cases included in the study were diagnosed by biopsy of different parts of the intestine. 46.2% of participants had a biopsy of the appendix. 8.2% of people had Ileum full-thickness biopsy, 6.8% people had Ileum Seromuscular biopsy, 5.6% of people had Colon full-thickness biopsy.

Among the 73 total cases included in the study, 46 (63%) were clinically suspected cases, and the remaining 27 (36.9%) were clinically established cases. Among clinically suspected, the majority (50.7%) had ganglionic cells only in proximal segments. Remaining 9 (12.3%) had no ganglionic cells in any of the biopsy specimens.

In clinically established cases ganglion cells were not seen in 23.3% of cases accounting for more than 50% of established cases, this finding is comparable to a study by Anuras S et al, on natural history of HD in adults and another study by Wang TY, et al, on HD in adults in which ganglion were found to be absent on rectal biopsy in all included participants.<sup>14,15</sup>

In this study, the rectal biopsy of all involved participants showed an absence of ganglion cells.<sup>14</sup> In clinically

suspected cases, more cases showed the presence of ganglionic cells only in proximal segments which is also suggestive of HD because the main characteristic of HD is the absence of ganglionic cells in distal parts of bowel.<sup>10</sup>

## ACKNOWLEDGEMENTS

Authors acknowledge the technical support in data entry, analysis and manuscript editing by "Evidencian Research Associates."

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Mabula JB, Kayange NM, Manyama M, Chandika AB, Rambau PF, Chalya PL. Hirschsprung's disease in children: a five-year experience at a University teaching hospital in northwestern Tanzania. *BMC Res Notes.* 2014 Dec 1;7(1):410.
2. Zaafour H, Mrad S, Mabrouk M, Haoues N, Salah MBH, Noomene R, et al. Hirschsprung's disease in adults: Clinical and therapeutic features. *Int Res J Surg.* 2015;2(1):008-17.
3. Baraket O, Karray O, Ayed K, Baccar A, Moussa M, Triki W, et al. Hirschsprung's Disease in Adult Treated by Coloprotectomy and Colo-Anal Anastomosis. *J Case Rep Stud.* 2016;4(2):210.
4. Ikoma N. Colonic perforation in a case of adult Hirschsprung's disease with acetylcholinesterase-negative neuronal fibers. *Am Surg.* 2013 Mar 1;79(3):E130.
5. Adhi M, Khan S, Zafar H, Arshad M. Duhamel's procedure for adult Hirschsprung's disease. *J Coll Phys Surg Pakistan.* 2012;22(6):395.
6. Qiu JF, Shi YJ, Hu L, Fang L, Wang HF, Zhang MC. Adult Hirschsprung's disease: report of four cases. *Inter J Clin Exper Pathol.* 2013;6(8):1624.
7. Martins MR, dos Santos CHM, Falcão GR. Late diagnosis of Hirschsprung's disease. *J Coloproctol.* 2015;35(3):178-81.
8. Siddiqui K, Choudhary HA, Khan AFA. Adult Hirschsprung's Disease; a case report of total Colonic Aganglionosis (Zuelzer-Wilson Syndrome). *PJMHS.* 2015;9(2):785-8.
9. Moore S. Hirschsprung disease: current perspectives. *Open Acc Surg.* 2016;9:39-50.
10. Green HL, Rizzolo D, Austin M. Surgical management for Hirschsprung disease: A review for primary care providers. *J Am Acad PAs.* 2016 Apr 1;29(4):24-9.
11. Duess JW, Hofmann AD, Puri P. Prevalence of Hirschsprung's disease in premature infants: a systematic review. *Pediatr Surg Inter.* 2014 Aug 1;30(8):791-5.

12. Bradnock TJ, Knight M, Kenny S, Nair M, Walker GM. Hirschsprung's disease in the UK and Ireland: incidence and anomalies. *Archiv Dis Childhood.* 2017 Aug 1;102(8):722-7.
13. Granéli C, Dahlin E, Börjesson A, Arnbjörnsson E, Stenström P. Diagnosis, symptoms, and outcomes of Hirschsprung's disease from the perspective of gender. *Surg Res Pract.* 2017;2017.
14. Anuras S, Hade JE, Soffer E, Lu CC, Loening-Baucke V, Soper RT, et al. Natural history of adult Hirschsprung's disease. *J Clin Gastroenterol.* 1984 Jun;6(3):205-10.
15. Wang TY, Lin TC, Hsu H. Hirschsprung's disease manifested with obstructive colitis in adult: a case report. *Zhonghua Yi Xue Za Zhi (Taipei).* 1996;58(6):444-7.
16. Croaker GD, Harvey JG, Cass DT. Hirschsprung's disease, colonic atresia, and absent hand: a new triad. *J Pediatr Surg.* 1997 Sep 1;32(9):1368-70.
17. Hofmann AD, Duess JW, Puri P. Congenital anomalies of the kidney and urinary tract (CAKUT) associated with Hirschsprung's disease: a systematic review. *Pediatr Surg Inter.* 2014;30(8):757-61.
18. Kyrklund K, Neuvonen MI, Pakarinen MP, Rintala RJ. Social morbidity in relation to bowel functional outcomes and quality of life in anorectal malformations and Hirschsprung's disease. *Eur J Pediatr Surg.* 2018 Dec;28(06):522-8.
19. O'donovan AN, Habra G, Somers S, Malone DE, Rees A, Winthrop AL. Diagnosis of Hirschsprung's disease. *AJR. Am J Roentgenol.* 1996 Aug;167(2):517-20.

**Cite this article as:** Prabakaran S, Thilagam KK. Profile of Hirschsprung's disease cases diagnosed in tertiary care teaching hospital: a retrospective observational study. *Int J Contemp Pediatr* 2020;7:551-5.