Waugh's Syndrome – A Rare Association of Intussusception and Malrotation – A Systematic Review

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How to cite this article:

Raj V, Tiwari P, Kumar Joleya M, Mohan Shukla R. Waugh's Syndrome – A Rare Association of Intussusception and Malrotation – A Systematic Review. Iranian Journal of Pediatric Surgery 2026; 12 (2): 147 – 160.

DOI: https://doi.org/10.22037/ irjps.v12i2.52506

Abstract

Introduction: Waugh's syndrome is a rare association of intussusception and malrotation first described in literature in 1911. The aetiology of this syndrome is thought to be the free-floating caecum. It was first published in the literature by George E Waugh.

Materials and Methods: A PubMed search was done on 15th May 2026 with the words "Waugh's syndrome" and "Waugh syndrome". A similar search with phrase "Waugh Syndrome" done on Scopus. A google scholar search with term "Waugh Syndrome" on same day was conducted.

received: 16 June 2026
accepted: 3 October 2026
Published online: 9 November 2026

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Results: The searched yielded 59, 20 and 49 results respectively. After PRISMA chart and exclusion we had included 40 articles and excluded 88 articles as they were reports in adult population, repeat articles and unrelated articles. In the English literature, a total of 81 cases are published till the article went to press.

Conclusion: This rare association of WS may be more frequent than being reported as it may be missed without a laparotomy. High index of suspicion for this association may be warranted whenever there is a long segment intussusception heralded by palpable mass per rectally or by visualised prolapsed segment within a short history of duration.

Keywords

- Waugh's Syndrome
- Intussusception
- Malrotation
- Systematic Review

Introduction

Intussusception is one of the mostcommon causes of intestinal obstruction in pediatric age group. It mainlyaffects children below 2 years with a peak incidence between 5 and 7 months.[1] Malrotationis when there is an error in the normal 270◦ counter-clockwise rotation of the bowel arising from midgut during antenatal period leading to mal-alignment of bowel and its mesentery[2] Waugh's syndrome(WS) is a rare entity described as association of malrotation with intussusception. The aetiology of this syndrome is thought to be the free-floating caecum.This association is named as WS because it was first published in the literature in 1911 by George E Waugh.[3]

Materials and Methods

A search for published literature was done using phrase 'Waugh syndrome" and 'Waugh`s Syndrome "onPubMed, Scopus and Google scholar. A total of 128 articles were identified. On screening, 49 duplicated articles were removed. 22

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irrelevant articles were removed. Further 17 others were also removed as they were reports of intussusception in adults. After screening, 40 articles were identified and studies. Data regarding age, gender, presenting complaints, investigations, intraoperative findings and postoperative outcomes were studied and tabulated. A total of 77 cases were identified which were reported in the 40 published articles.

Result

The searched yielded 59, 20 and 49 results respectively. After PRISMA chart and exclusion we had included 40 articles and excluded 88 articles as they were reports in adult population, repeat articles and unrelated articles. In the English literature, a total of 81 cases are published till the article went to press.

a total of40 reports and 77cases **(Table 2)**. A total of 128 articles were screened and 49 repeats were excluded. Further 22 articles were excluded as they were irrelevant and 17 articles excluded as they were articles in adult population **(Table 1).**

Discussion

The association of WS hasbeen rarely reported in the English literature. Breretonin his prospective study among 49 cases of intussusception reported 15 patients withthis syndromewhich is the largest series that reports this rare association[3]. They first called this association Waugh's syndrome afterGeorge E Waugh, who first described this association in 1911 in 3 boys4.A search of thepublished English literature revealed

The aetiology of this rare association is speculated to be because of the unfixed caecum and mobile colon and malrotation.We believe that this is the reason why there is a long segment intussusception leading to clinicallypalpable or visible rectal mass. We also believe this alignment of colon also makes it easier for manual reduction of Intussusception as compared to cases where there is fixed splenic and hepatic flexures. Breckon and Brereton also agree to this as the aetiology of WS [3].

Inan et al reported WS where both children were found to have an unfixed cecum and mobile colon[6]. While Behera et al. reported this association as a blessing in disguise as this prevented bowel ischemia in spite of a long segment intussusception[7]. One study

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reported a lead point as lymphangioma causing colocolic intussusception[8]. Two other studies reported Meckel's as a part of intra operative findings not acting as a lead point[4,7].

The age group mostly affected was 5-7 months, which is similarto the peak incidence reported by Asbah et al[9]. In 3 different reports unusual ageswere reported, which included a 28-week preterm[8], 9-yeargirl [10] and 12-year child[11]. The oldest child reported with WS is a 17-year boy with prolapsed intussusception and multiple polyps acting as lead point[12]. In all except 7 studies, the diagnosis of this association was made intra-operatively as in the table 1. In a few centres where a trial of hydrostatic reduction (Contrast Enema) was attempted prior to laparotomy, the association of malrotation was identified pre operatively[3,10,13–20]. Nonetheless their management did not change after this discovery.

Among the published studies, reports of trans anal visible prolapse was reported in 5[12,15,21–24]and per rectally palpable intussusception was reported in 6studies.[4,5,7,15,25,26]

Laparotomy with Ladd's procedure is the treatment of choice since it can deal with both the pathologies in this syndrome. Laparoscopic repair in Waugh's syndrome is also reported by Harper et al[13].

Brereton study reported a higher incidence of WS (15 out of 49). This is probably not so because in many centres and earlier presentations, Ultrasound or Fluoroscopic guided hydrostatic or pneumatic reduction may be attempted which sometimes may fail to pick up the association of malrotation with intussusception[5]. This also can be one of the reasons for failed reduction or requirement of multiple attempts for successful reduction[7]. There were seven authors reporting pre laparotomy reduction trial whichwas successful but a laparotomy had to be done to deal with malrotation[14,16,17]. Four studies reported failed non-surgical reduction for which laparotomy was performed[5,10,15,27].

The post-surgical complications included re-laparotomy and stoma formation. There were deaths also as was reported by Brereton[3], Al-Momani et al [15] and Saxena et al [19].

Among 39 reports, 14 studies reported ileocecal intussusception discovered at exploratory laparotomy without any trans anal prolapse or per rectal mass palpable[6,9,11,27–37]. Associated anomalies with WS included volvulus in 5 reports[5,13,17,38,39,] Meckel's diverticulum in

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two[4,7], polyp in two[12,26], duodenal stenosis[40]and Pierre robin sequence[41]in one as tabulated. All the intussusceptions were ileocolic except in fourwhere colocolic was reported in two cases [8,26] and jejunojejunal were reported in two[13,19].

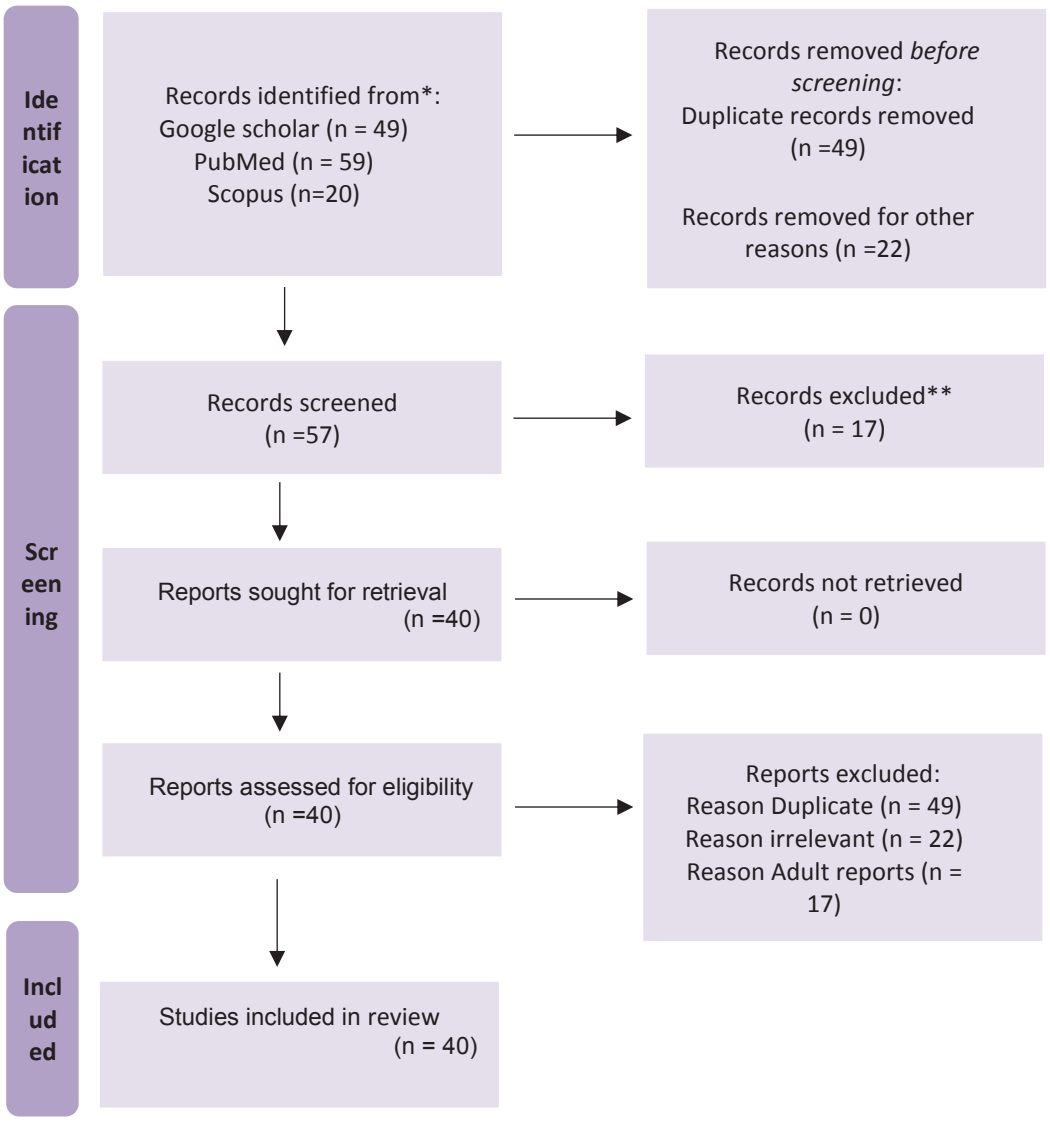
Zavraset al reported their study a case with history of chronic abdominal symptoms for 6 weeks before exploratory laparotomy was done[42]. Carmine in their study reported repeated episodes of trans anal prolapse of intussusception after hospitalization during the course of treatment[22]. Sinha et al in their report from Norwich found Waugh syndrome associated with Non-Hodgkin's Lymphoma acting as a lead point. They named this association as Norwich triad[18].

Conclusion

This rare association of WS may be more frequent than being reported as it may be missed without a laparotomy. High index of suspicion for this association may be warranted whenever there is a long segment intussusception heralded by palpable mass per rectally or by visualised prolapsed segment within a short history of duration. Non operative management of intussusception may be insufficient when associated with malrotation. This association may be a saving grace for long segment intussusceptions as the alignment of bowel in this condition delays the ischemic changes in bowel otherwise seen in fixed colonic long segment intussusceptions.

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Table 1: PRISMA flowchart.



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Table 2: showing summary of review of literature of 81 cases.

Author	Journal	Year	Number of cases	Country of origin	Associated anomaly and distinct feature	Diagnosis of WS Pre-operative or Intra operative	Per rectal mass	Mortality
George Waugh (4)	The Lancet	1911	3	London, UK	Meckel's diverticulum - 1		Palpable – 3	
W Perrin and E Lindsay (37)	British Journal of Surgery (BJS)	1921	2	London, UK				
D P Van Meurs (36)	BJS	1946	1	London, UK				
M Tabibi et al (35)	J Am Osteopath Assoc	1971	1	USA				
Eugene Berry and John Ray (12)	Southern Medical Journal	1972	1	Los Angeles, USA	Polyp, 17-year child		Visible	
David Stewart et al (34)	Surgery	1976	1	Boston, USA				
Howard Filston and Donald Kirks (16)	Journal of Pediatric Surgery (JPS)	1981	1	North Carolina, USA		Pre-operative		
Ornstein and Lund (38)	BJS	1981	1	Middlesex, UK	Volvulus			
George Welch et al (33)	Annals of Royal College of Surgeons of England	1983	1	Glasgow, UK				
T Burke and Ray Fitzgerald (17)	Australian and New Zealand Journal of Surgery	1985	1	Dublin, Ireland	Volvulus	Pre-operative		
R Brereton et al (3)	BJS	1986	15	London, UK		Pre-operative		One died
Sudhir Jain (25)	Archieves of Surgery	1989	2	Delhi, India			Palpable – 1	

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H Ward and R Brereton (40)								H Ward and R Brereton (40)
European Journal of Pediatric Surgery	1992	2	London, UK	Duodenal stenosis - 1				European Journal of Pediatric Surgery
Y Sarin and V Singh (32)								Y Sarin and V Singh (32)
Indian Pediatrics	1995	1	Delhi, India					Indian Pediatrics
Edrise Lobo et al (14)								Edrise Lobo et al (14)
Pediatric Radiology	1997	2	Toronto, Canada		Pre-operative			Pediatric Radiology
V Breckon G and Hadley (5)								V Breckon G and Hadley (5)
Pediatric Surgery International (PSI)	2000	6	Durban, South Africa	Volvulus - 1		Palpable - 1		Pediatric Surgery International (PSI)
P.L.N.G Rao and Kumar(31)								
Indian Journal of Pediatrics	2005	1	Manipal, India					
C Lukong et al (39)								
South Africa Journal of Surgery	2007	1	Zaria, Nigeria	Volvulus				
Akram Al-Jahdali et al (8)								
Hashem Al-Momani (15)								Hashem Al-Momani (15)
Annals of Saudi Medicine	2014	7	Amman, Jordon		Pre-operative	Palpable – 1 visible – 1	One died	Annals of Saudi Medicine

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Chandrasen Sinha (18)								Chandrasen Sinha (18)
BMJ Case Reports	2014	1	Norwich, UK	Non-Hodgkin's lymphoma, Norwich triad	Pre-operative			BMJ Case Reports
Manuel Gil-Vargas (29)								Manuel Gil-Vargas (29)
Cirurgia Cirujanos	2015	1	Puebla, Mexico					Cirurgia Cirujanos
Rahul Saxena (19)								Rahul Saxena (19)
Pediatrics and Neonatology	2015	1	Delhi, India	Jejunojejunal intussusception, 29 weeks preterm	Pre-operative		One died	Pediatrics and Neonatology
Nick Zavras (42)								Nick Zavras (42)
Case reports in surgery	2016	1	Athens, Greece	Chronic Intussusception				Case reports in surgery
Fatima Dirani (20)								Fatima Dirani (20)
Clinical Images and Case Reports Journal	2021	1	Lebanon		Pre-operative			Clinical Images and Case Reports Journal
ChukwubuikeEmeka (21)								ChukwubuikeEmeka (21)
Journal of medical case reports and case series	2021	1	Enugu, Nigeria	Intussusception 2 weeks ago deemed treated with hydrostatic reduction		Visible – 1		Journal of medical case reports and case series
Noviello Carmine (22)								Noviello Carmine (22)
Journal of Pediatric Surgery Case Reports	2022	1	Naples, Italy	Multiple episodes of transanal prolapse		Visible – 1		Journal of Pediatric Surgery Case Reports
Ibrahim Elkier et al (11)								Ibrahim Elkier et al (11)

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Ethical Consideration

Ethical Consideration - This study received institutional ethics committee clearance through letter dated 10th may 2026

Acknowledgment

Not applicable

Funding/Support

Not applicable

Conflict of interests

There is no conflict of interest

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