



Laparoscopic Management of Small Bowel Obstruction with a Single Transition Point in a ‘Virgin’ Abdomen’’: Cohort Study

Rajput K*, Patel R and Kalaiselvan R

St Helens and Knowsley NHS Foundation Trust, UK

Abstract

Introduction: Congenital Band Adhesions (CBA) are fibrous bands that may present as Small Bowel Obstruction (SBO) to the emergency general surgical department. They occur exclusively in patients who have never undergone abdominal surgery. Laparoscopic approach to the management of SBO is gaining precedence.

We report our experience of laparoscopic division of CBA causing SBO.

Method: Data was collected retrospectively from a prospectively maintained logbook of emergency cases performed over a 17-month period (January 2020 to May 2021) to identify emergency operations performed for CBA. Patients that underwent laparoscopic repair of CBA, with no previous abdominal surgeries were included. Patients were routinely followed up in an outpatient telephone clinic.

Results: Nine cases were included in the study, with a median age of 77 (range 63 to 82 range). One operation was converted to laparotomy due to small bowel perforation requiring resection. All patients underwent a pre-operative Computed Tomography (CT). Additionally, all band adhesions were found to cause obstruction at distal ileum. The median length of operation was 70 min (range 55 to 95 range). Median length of inpatient stay was 5 days. There were no mortalities, nor were there any complications on follow up. Patients reported returning to normal daily activity at a median time of 8.5 days (range 0 to 42 days). Five patients denied experiencing pain post-operatively.

Conclusion: Early diagnosis by CT scan is imperative to achieve favourable surgical outcomes. Our study has demonstrated the safety and efficacy of early laparoscopic division of band adhesions.

Keywords: Laparoscopy; Congenital band adhesions; Bowel obstruction

OPEN ACCESS

*Correspondence:

Kunal Rajput, St Helens and Knowsley NHS Foundation Trust, Warrington Road, Prescott, Merseyside L35 5DR, UK, Tel: (+44) 1514261600;

E-mail: kunal.rajput@doctors.org.uk

Received Date: 13 Dec 2021

Accepted Date: 28 Jan 2022

Published Date: 01 Feb 2022

Citation:

Rajput K, Patel R, Kalaiselvan R. Laparoscopic Management of Small Bowel Obstruction with a Single Transition Point in a ‘Virgin’ Abdomen’’: Cohort Study. *Clin Surg*. 2022; 7: 3401.

Copyright © 2022 Rajput K. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

Small Bowel Obstruction (SBO) is common emergency general surgical presentation. There were 10,546 emergency bowel surgeries performed for intestinal obstruction between March 2020 and September 2020 [1]. Among these, 19% underwent adhesiolysis; this remains the most common reason to perform emergency abdominal surgery [1]. The overall mortality rates for SBO are relatively low at 6.6% [2]. However, the associated medical and surgical morbidity associated with ongoing SBO are numerous. These include electrolyte disturbances, malnutrition, faecal peritonitis and subsequent stoma formation [2]. Although less common, a similar clinical presentation is faced in patients with Congenital Band Adhesions (CBA) [3].

Unlike, post-operative adhesions, these are not exacerbated by previous abdominal surgery, inflammation or malformations. The adhesions form a passage for bowel or mesentery and cause constriction and strangulation of bowel. Diagnosis can be challenging due to the rarity of the condition; hence a thorough assessment and clinical acumen are essential. The clinical presentation is dominated by abdominal distension, abdominal pain and vomiting, similar to other aetiologies causing SBO [2]. Due to the rarity of the condition, the incidence of congenital band adhesions is still uncertain [4,5]. Although congenital bands are present from birth, complications from existing bands can present at any age. Prompt clinical diagnosis and early surgical intervention are paramount to achieving favourable outcomes [6].

A minimal access approach to the management of adhesional SBO is gaining proponents due to

evidence demonstrating reduced mortality, morbidity, inpatient stay and surgical site complications over traditional laparotomy [7]. The 30-day mortality for emergency laparoscopic surgery is reported as 3.4% when compared to 12.5% for the open approach, as reported by the National Emergency Laparotomy Audit [1]. Additionally, Tengberg et al. multicentre study report a 30-day complication rate of almost 50% for patients undergoing an emergency laparotomy [8].

There are a limited number of published case reports discussing CBA and management strategies [3-5,9]. These reports have outlined the diagnostic challenges faced due to the rarity of congenital band adhesions. Our study aimed to outline our experience and outcomes from laparoscopic repair of CBA performed at within our unit and to determine the safety of laparoscopic approach in the management of CBA.

Method

Data was collected retrospectively from a prospectively maintained logbook of emergency cases performed over a 17-month period (January 2020 to May 2021) to identify emergency operations performed for CBA. Patients that underwent abdominal surgery for adhesional SBO with no previous abdominal surgery were included. The study has been reported in line with the STROCSS criteria.

Data collected included demographics, American Society of Anaesthesiology grade (ASA) and clinical presentation (vomiting, abdominal tenderness and abdominal distension). In addition, we also identified surgical approach to management, location of obstruction/band adhesion and if bowel resection was required.

Our primary outcome measures were crude mortality and complications, as determined by Clavien-Dindo classification. Secondary outcomes included length of time taken to perform CT scan, time to operation, length of inpatient stay and length of time till return of bowel function.

Laparoscopic division of congenital band adhesions at our centre

All surgery was performed in a dedicated emergency theatre with a dedicated emergency team coordinating the session. All patients were assessed by the anesthetic team prior to undergoing surgery. All operations were performed under consultant supervision.

Laparoscopic access was gained through an open Hasson approach *via* a peri-umbilical incision. Two further 5 mm laparoscopic ports were inserted under vision according to CT findings. Band adhesions were identified by locating the junction of transition between dilated and collapsed small bowel (Figure 1). The band was excised with

laparoscopic scissors \pm diathermy or harmonic scalpel to reduce the chance of further recurrence of small bowel obstruction secondary to that band (Figure 2). Following this, the small bowel was surveyed from the ileocaecal junction to the duodeno-jejunal junction proximally to evaluate the small bowel and ensure no further areas of obstruction or bowel compromise.

Discharge from hospital was deemed safe when the patients were fully tolerant of oral intake, had a return of bowel function and had adequate control of pain on oral analgesia. Patients were followed up in an outpatient telephone clinic following discharge, to limit contact during the COVID-19 pandemic. The following outcomes were evaluated: Pain scores (immediately post-operatively and on discharge), time to return of normal bowel function and wound complications. A numerical pain score was used from 0 being no pain to 10 being the worst pain imaginable for the patient.

Results

Patient characteristics and demographics

A total of nine cases over the 17-month period were identified with small bowel obstruction secondary to congenital band adhesions that were managed laparoscopically. The median age at presentation was 77 years, with an inter-quartile range of 71 to 82 years. There was a male predominance, with five male patients (5/9). ASA grade was 2 in six of the cases and 3 in the remaining. None of the patients described a history of previous inflammatory intra-abdominal conditions that could potentially predispose to the formation of band adhesions.

All patients were referred to our emergency surgical team *via* the emergency department. Presentations of congenital band adhesions were most commonly vomiting, abdominal tenderness and abdominal distension (Figure 3). Patients most frequently presented with a combination of all three symptoms. Abdominal tenderness was present in all patients, with vomiting occurring in eight of the nine patients, which was bilious in the majority of these cases, (4/9). Seven patients also reported abdominal distension (Figure 3). Computed Tomography (CT) scan with intravenous contrast was performed in all cases to obtain radiological confirmation of diagnosis. The site of the adhesion was determined *via* CT findings and during laparoscopy to be at distal ileum in all cases and subsequently caused obstruction at that level.

Eight of these cases were completed laparoscopically with division of CBA, however one patient required conversion to midline laparotomy. One patient required conversion to laparotomy due to bowel compromise and peritoneal contamination. In this instance, bowel resection was undertaken with primary anastomosis.

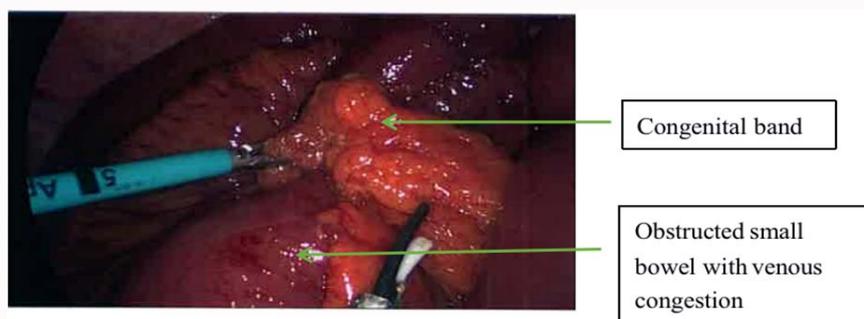


Figure 1: A congenital band adhesion causing loop obstruction between two loops of small bowel with strangulation. The small bowel is injected and edematous. These features represent early signs of venous congestion and pose a potential risk for bowel compromise if untreated.

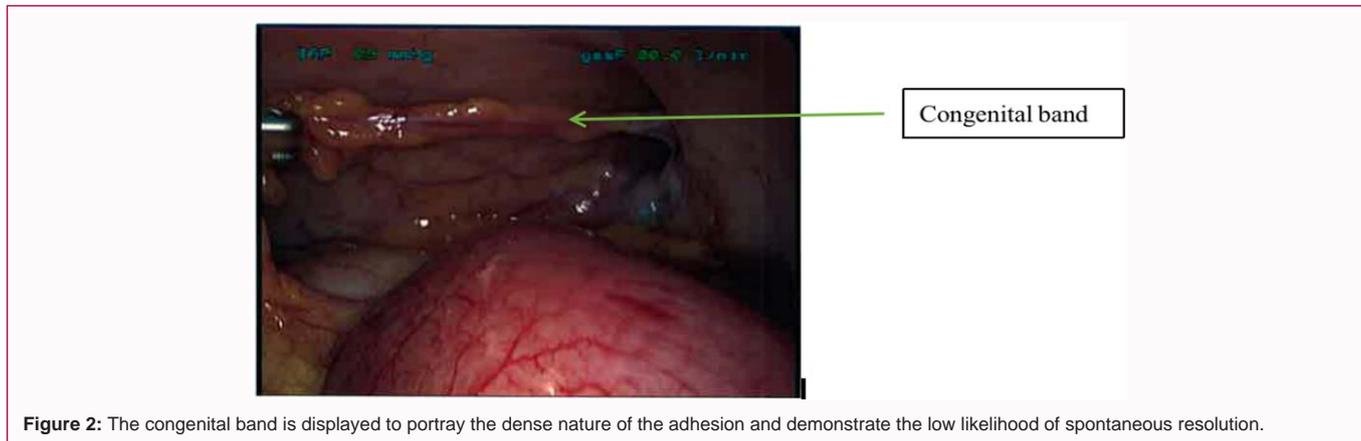


Figure 2: The congenital band is displayed to portray the dense nature of the adhesion and demonstrate the low likelihood of spontaneous resolution.

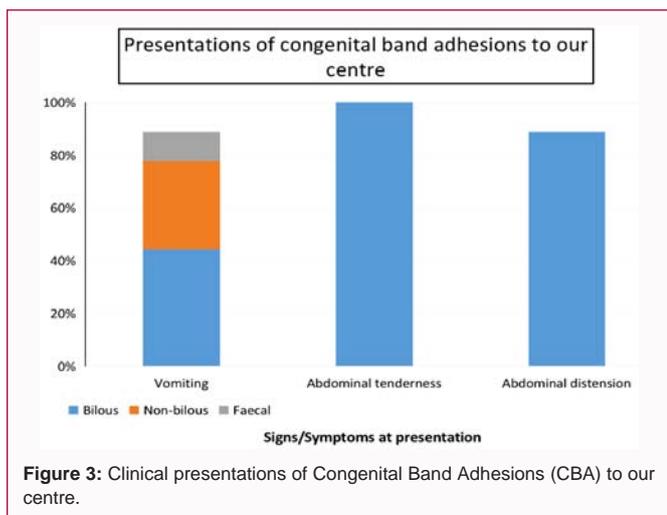


Figure 3: Clinical presentations of Congenital Band Adhesions (CBA) to our centre.

Table 1 summarizes the patient demographics and cohort characteristics. The majority (6/9) of CT scans were performed within 24 h of admission. Operative intervention was also performed within one day of admission in four (4/9) cases, as summarised in Figure 4.

Immediate post-operative outcomes of laparoscopic division of congenital band adhesions

No deaths were recorded in the 30-day post-operative period. The median operative time for the laparoscopic approach was 70 min (range 55 min to 95 min). No post-operative complications were recorded with laparoscopic approach in the 30-day post-operative period. Return of bowel function was achieved at 4 days with the laparoscopic approach. The median length of stay was 5 days (range 3 to 8 days).

Operative time in the patient that required a laparotomy was 95 min with an extended length of stay to 8 days due to postoperative ileus. They had a return of bowel function at 8 days.

Outcomes from outpatients telephone clinic follow-up

The median length of time to return to activities of daily living was 8.5 days (range 0 to 42 days) following discharge. There were no post-operative wound complications and all patients expressed being very satisfied with their laparoscopic surgical scars. Five patients denied experiencing any abdominal tenderness immediately following their surgery, and six of the patients denied pain on discharge. As would be anticipated, the patient that underwent conversion to laparotomy expressed a pain score of eight out of ten on the numerical pain rating

Table 1: Cohort characteristics for patients that underwent laparoscopic division of congenital band adhesions at our centre.

Cohort characteristics	N=9 (%)
Age (range)	77 (63-82)
Gender	
Male	5 (55.6)
Female	4 (44.4)
American Society of Anesthesiology grade (ASA)	
2	6 (66.7)
3	3 (33.3)
Computer Tomography scan	9 (100)
Location of obstruction/band adhesion	
Distal ileum	9 (100)
Resection of small bowel	1 (7.7)
Length of operation, median (range)	70 minutes (55-95)
Conversion to open	1 (11.1)
90-day Mortality	0
Complications	0

scale immediately post-operatively. The median pain score in all patients on discharge was zero (range 0 to 10).

Discussion

Congenital band adhesions are a rare etiology of small bowel obstruction. A high index of suspicion especially in the absence of previous abdominal surgery and prompt radiological imaging are paramount to favourable outcomes [10-12]. With delayed definitive surgical intervention, there is a risk of bowel necrosis and perforation leading to peritoneal soiling, especially in the case of closed loop obstruction due to bowel volvulus within the band adhesion. Mortality rates associated with small bowel obstruction are low [2]. However, in the presence of complications, these can rise significantly [1,2]. In the case of congenital band adhesions, early diagnosis and planning for definitive surgical intervention are vital.

The reported incidence of CBA is low. Other more common aetiologies are often suspected first; such as hernias, malignancy and Crohn’s disease [2]. The suspicion of CBA should be raised when a patient with signs of small bowel obstruction and no previous abdominal surgeries presenting to the emergency surgical department. Although abdominal radiographs may demonstrate features of dilated small bowel loops with air-fluid levels, they may not be diagnostic and

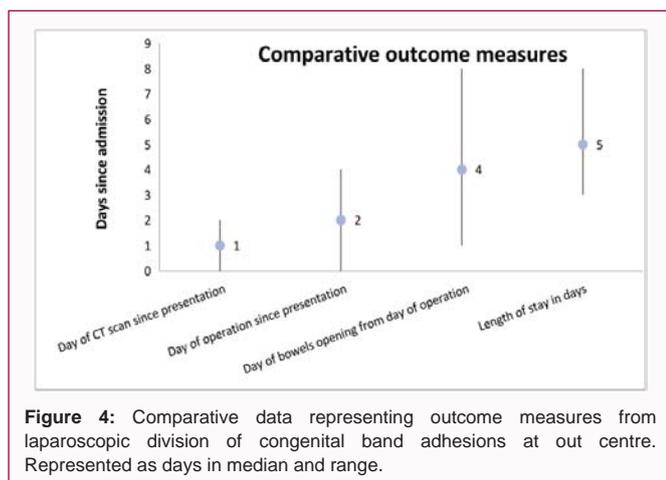


Figure 4: Comparative data representing outcome measures from laparoscopic division of congenital band adhesions at out centre. Represented as days in median and range.

CT scan with IV contrast is vital for definitive diagnosis. Additionally, a CT scan not only identifies the single transition point but also forms guidance for laparoscopic port placement and operative planning.

Conservative management is initially employed for postoperative adhesional SBO; however, congenital bands are thicker and considerably more resilient, reducing the possibility for entrapped bowel to spontaneously resolve. The NASBO identified 18.4% of patients with congenital adhesions were managed conservatively, whereas comparatively, a larger proportion of patients (65%) with post-operative adhesions were managed conservatively [2]. This emphasizes the reluctance of CBA to spontaneously resolve with conservative management. Hence, from our study we recommend early laparoscopic surgical intervention.

It is worth noting that laparoscopic surgery in the presence of dilated small bowel may increase the risk of injury to visceral organs due to the lack of working space abdominally [10]. This poses an element of challenge for the surgeon and a greater stress. However, from our experience, early surgical intervention reduces the time for further dilatation of small bowel, improving laparoscopic intra-abdominal space, hence, reducing the probability of iatrogenic injuries.

In the NASBO study, laparoscopic surgery was attempted as an emergency operation in 14.1% for small bowel obstruction [2]. Furthermore, the NELA in 2019 reported a 30-day mortality of 3.5% for laparoscopic surgery compared to 10% for open surgery. This likely represents the propensity to perform the laparoscopic approach for less unwell patients with lower pre-operative predicted mortality risk. At the inception of laparoscopic surgery, operating times were historically longer when compared to the open approach [13]. However, with the frequent use of minimal access surgery and the easy availability of laparoscopic facilities in operating theatres, operative times can be comparable or potentially lower than an open approach.

The numerous advantages of laparoscopic surgery are well known, in particular the reduced length of stay due to reduced post-operative pain, ileus and pulmonary complications [13]. Laparoscopic surgery also has a direct impact on patients returning to their baseline functional status. The smaller skin incisions in laparoscopic surgery result in increased compliance with enhanced recovery post-operatively and patients returning to normal activity sooner. Additionally, the reduced iatrogenic trauma caused by reduction in

contact with bowel and viscera reduces incidence of post-operative adhesions [13]. In addition, complications such as chronic abdominal pain, infertility, obstruction, incisional hernia and the need for further operations and morbidity are reduced [14]. The laparoscopic camera is also ideal to visualize the intra-abdominal contents systematically to aid a thorough assessment [15].

In our study, all CBA were found at the distal ileum, which echoes the experience of the other reports in the literature [1,3]. The location of the bands could be hypothesized to occur secondary to an episode of unrecognized or conservatively treated appendicitis causing inflammatory reaction [16]. When small bowel is found congested or bruised, careful assessment of the segment is vital. With any uncertainties regarding the viability, the practice should continue to a small incision to deliver the segment of small bowel and perform formal assessment. If there are signs of bowel compromise, a segmental resection should be carried out, as described in one of our cases.

We acknowledge the limitations of this relatively small case series in a retrospective study; however, CBA is an uncommon etiology and we believe that our findings provide a valuable insight into the role of laparoscopic approach in the management of CBA.

Conclusion

Although CBA remains a rare presentation to the acute surgical department, early diagnosis and operative management are vital in achieving good surgical outcomes. We have demonstrated that laparoscopic approach to repair of CBA is both safe and effective.

References

1. COVID-19 Report - The National Institute of Academic Anaesthesia [Internet]. Nela.org.uk. 2021.
2. Lee MJ, Sayers AE, Drake TM, Marriott PJ, Anderson ID, Bach SP, et al. National prospective cohort study of the burden of acute small bowel obstruction. *BJS Open*. 2019;3(3):354-66.
3. Yang KH, Lee TB, Lee SH, Kim SH, Cho YH, Kim HY. Congenital adhesion band causing small bowel obstruction: What's the difference in various age groups, pediatric and adult patients? *BMC Surg*. 2016;16(1):79.
4. Fang AC, Carnell J, Stein JC. Constipation in a 7-year-old boy: Congenital band causing a strangulated small bowel and pulseless electrical activity. *J Emerg Med*. 2012;42(3):283-87.
5. Nicolas G, Kfoury T, Shimlati R, Koury E, Tohmeh M, Gharios E, et al. Diagnosis and treatment of small bowel strangulation due to congenital band: Three cases of congenital band in adults lacking a history of trauma or surgery. *Am J Case Rep*. 2016;17:712-9.
6. Butt MU, Velmahos GC, Zacharias N, Alam HB, de Moya M, King DR. Adhesional small bowel obstruction in the absence of previous operations: management and outcomes. *World J Surg*. 2009;33(11):2368-71.
7. Sajid MS, Khawaja AH, Sains P, Singh KK, Baig MK. A systematic review comparing laparoscopic vs. open adhesiolysis in patients with adhesional small bowel obstruction. *Am J Surg*. 2016;212(1):138-50.
8. Tengberg LT, Cihoric M, Foss NB, Bay-Nielsen M, Gögenur I, Henriksen R. Complications after emergency laparotomy beyond the immediate postoperative period-A retrospective, observational cohort study of 1139 patients. *Anaesthesia*. 2017;72(3):309-16.
9. Wu JM, Lin HF, Chen KH, Tseng LM, Huang SH. Laparoscopic diagnosis and treatment of acute small bowel obstruction resulting from a congenital band. *Surg Laparosc Endosc Percutan Tech*. 2005;15(5):294-6.
10. Chang YT, Chen BH, Shih HH, Hsin YM, Chiou CS. Laparoscopy in

- children with acute intestinal obstruction by aberrant congenital bands. *Surg Laparosc Endosc Percutan Tech.* 2010;20(1):e34-7.
11. Akgür FM, Tanyel FC, Büyükpamukçu N, Hiçsönmez A. Anomalous congenital bands causing intestinal obstruction in children. *J Pediatr Surg.* 1992;27(4):471-3.
 12. Liu C, Wu TC, Tsai HL, Chin T, Wei C. Obstruction of the proximal jejunum by an anomalous congenital band--a case report. *J Pediatr Surg.* 2005;40(3):E27-9.
 13. Johnson A. Laparoscopic surgery. *Lancet.* 1997;349(9052):631-5.
 14. Suter M, Zermatten P, Halkic N, Martinet O, Bettschart V. Laparoscopic management of mechanical small bowel obstruction: are there predictors of success or failure? *Surg Endosc.* 2000;14(5):478-83.
 15. Farinella E, Cirocchi R, La Mura F. Feasibility of laparoscopy for small bowel obstruction. *World J Emerg Surg.* 2009;4,3.
 16. Maeda A, Yokoi S, Kunou T, Tsuboi S, Niinomi N, Horisawa M, et al. Intestinal obstruction in the terminal ileum caused by an anomalous congenital vascular band between the mesoappendix and the mesentery: Report of a case. *Surg Today.* 2004;34(9):793-5.