

Original Research Article

Oral Water-Soluble Contrast Agent as the Definitive Treatment of Uncomplicated Adhesive Bowel Obstruction in Infants and Neonates

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Abstract: *Aim:* To assess feasibility, safety and long-term outcome of a water-soluble contrast agent (Gastrografin™) in surgical neonates/infants who present with ABSO. *Method:* 18 Neonates, who continued to exhibit signs of intestinal obstruction after one week post surgery, were given 1-2 mls/kg of oral Gastrografin for 5-8 days. *Result:* All but one patient could be fed within 12 hours and discharged home soon afterwards. A single patient returned 6 months later with ABSO and was similarly treated again. There was no morbidity or mortality due to this technique. *Main Conclusion:* Gastrografin contrast given orally can result in relief of ABSO, as similarly described in adult and older children.

Keywords: Neonatal Surgery, Bowel obstruction, Water-soluble Contrast.

INTRODUCTION

Adhesive bowel obstruction (ABSO) is a well described complication, following intra—abdominal surgery. In infants the reported incidence is between 2.4-6.2% within one year after surgery but it rarely occurs years later unlike the reported rates in adult patients [1].

Higher incidence of ABSO is described to be due to a number of factors, such as prolonged bowel handling and complexity of intestinal surgery.

Second and 3rd bouts of obstruction occur less frequently and no reliable data is available to its frequency in later life.

Traditional management of these patients have been to allow for free naso-gastric (NG) drainage, intra-venous fluid and nil-per-os. The resolution of symptoms occurs in most patients within 2-3 days [2]. This is thought to allow the bowel to empty and assume normal position, achieve normal tone and de-obstruct, especially in case of a large food bolus.

A more active management has been advocated, for many years, by giving the patient hyper-osmolar oral contrast medium as a "laxative" to actively reduce inflammation and bowel oedema. The most frequently used agent is Gastrografin™ (Bracco Diagnostics Inc., NJ,USA) which contains hyper-osmolar chemical dicitrate meglumine .

In adult and pediatric literature, it is a well described method in dealing with ABSO and has been shown to decrease the need for repeat operation and stay days in these patients [3-5].

In this study, we investigated if that the same principle can be applied and thus achieved similar outcome in neonates and infants with ABSO.

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PATIENTS AND METHODS

A prospective data collection was undertaken over a 2 year period (Jan 2016-Dec 2017), to identify neonates and infants who presented with ABSO after a surgical procedure. They received Gastrografin, if after 7-10 days, they could not tolerate trophic feeds.

There were a total of 185 neonatal bowel procedures were carried out in the 2 year period review. 28 cases (15%) developed ABSO in neonates or young infants. Eight patients could be given increasing volume of feeds after 5-7 days and excluded from the study. A further two cases were excluded because of signs of peritonism and gross electrolyte imbalance.

The gastrografin-treated cohort, therefore, consisted of 18 neonates.

The technique was standardized; once the gastric content was aspirated via NG tube, the patients received 1-2m/kg of undiluted gastrografin through their NG tube daily for 5-8 days. The NG tube was clamped for one hour to avoid simple return of the contrast. The patients were then fed 1/5 of the expected amount of their feed and stooling charted for the next 5-7 days. This was the end point of the study.

Clinical records were examined to obtain the following:

1. Time to passage of stool and initiation of feeding
2. Failure of therapy as in need for surgical intervention
3. Complication of Gastrografin , specifically chemical pneumonitis secondary to its aspiration or electrolyte derangement

Ethical approval was obtained by local review committee: International Review Board (IRB) number 133445565.

RESULT

The 18 patients requiring Gastrografin for ABSO were: 11 patients who had stoma closure following necrotising enterocolitis (NEC), 5 had silo-bag abdominal wall closure for gastroschisis and one had postero-lateral diaphragmatic hernia closure. There was one recurrent ABSO patient, who was admitted 4 months later was readmitted, and a repeat gastrografin treatment was successfully carried out.

Days to passage of stool following gastrografin was on average of 1.2 days (range 0.5-6 days) and full feeding was successfully initiated within 12 hours (range 1-7 days).

One patient with gastroschisis did not respond and required extensive operative adhylosis. In this case, the cause of obstruction was found to be a dense constricting band, which was released during re-operation.

All patients maintained electrolyte balance and there were no cases of pneumonitis.

There was a single late mortality in an NEC case, 6 weeks after gastrografin treatment, due to unrelated chronic respiratory failure.

In the follow up-period of over 2-3 years, no further relapse of obstruction was noted.

DISCUSSION

ASBO is a well known complication of any type of intra-abdominal surgery including laparoscopic approach. Its aetiology is due to fibrotic bands, and healing attempt by the peritoneal surface as well as bowel loops. Similar events occur with mini-abscess that occurs in the pelvic cavity or para-colic gutter. These adhesions can shorten rapidly and result in physical compression and obstruction of the bowel loops, the effect worsen by additional inflammation and oedema of the bowel wall. Standard treatment allows for gradual decrease in inflammation and slow stretching of obstructing band and relief of the obstruction.

Similar but more rapid relief of the obstruction can be achieved by using hyper-osmolar contrast medium. The most widely used agent is diatrizoate-containing solution which has 6 times osmolality of the extra-cellular fluid. The mechanism of action appears that when ingested its hyperosmolality resulted in reduced bowel oedema combined with its intrinsic prokinetic effect [6].

Its usage in relieving ASBO in adults was described a decade ago and was proven to reduce the time of ASBO resolution, safe to administer and earlier discharge in patients, who were treated non-operatively.

The main adverse effect is due to its hypersomolar effect. Firstly, vomiting and aspiration of the agent can cause a considerable pnemonitis and respiratory compromise [7] and secondarily its ingestion can result in electrolyte imbalance from

increased in extra-fluid shift [8]. Both side effects are considered to be more serious in infants due to immature lung and delicate homeostasis relative to adult patients.

In general, any sign of peritonism or physiological instability would be contra-indication to Gastrografin usage in adults or neonates alike.

CONCLUSION

This is the first comprehensive, prospective and descriptive study shows that oral Gastrografin usage is safe in cases of ABSO. Appropriate monitoring is mandatory to avoid its known serious complications, however, many infants were saved having potentially fatal reoperations in this cohort.

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