Strangulated Intestinal Obstruction due to Appendiceal Tourniquet: A Case Report

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Abstract

Background: Intestinal obstruction is regarded as one of the most common surgical emergencies with well known varied causes. Recently, acute appendicitis is being realised to be a significant cause. However, strangulation of the intestine caused by appendicitis is a rare occurrence. We, therefore, report a case of strangulated intestinal obstruction due to appendiceal tourniquet.

Materials and Methods: A case report and discussion of the relevant literature is presented.

Case Report: H R is a 28-year old young man who presented with a 5 day history of sudden onset of abdominal pain which became generalised and worsened a day prior to presentation, was associated with abdominal distension, vomiting of bilious gastric effluent and constipation. There was no history of previous abdominal surgery. Physical examination revealed an ill-looking young man who was febrile and moderately dehydrated. The abdomen was distended and tender, with guarding and rigidity particularly in the region of the right iliac fossa. He had normal rectal findings. The rest of the physical examination was unremarkable. Laboratory investigations were within normal limits except leucocytosis due to Neutrophilia. Plain abdominal X-ray, erect and supine showed multiple air-fluid levels and dilated loops of bowel indicating small bowel obstruction. The patient was resuscitated and counseled for emergency exploratory laparotomy. Findings revealed a distended, near gangrenous loop of ileum occluded by a ring of an inflamed appendix which was fixed at the base and near the tip by adhesions. Appendicectomy was done to release the obstruction. Viability of the near gangrenous ileum was restored following a 5 minute application of gauze soaked in warm saline. The abdomen was closed in layers and patient had an uneventful recovery. Histology report of the appendix revealed features of appendicitis. He was doing well as at last visit to surgical outpatient department [SOPD], 6 month after operation.

Conclusion: Acute appendicitis is an important cause of intestinal obstruction. Therefore a high index of suspicion is key to early recognition and treatment as simple appendicectomy may just suffice.

Introduction

Intestinal obstruction is often regarded as one of the most common surgical emergencies that are well known worldwide [1]. Even though, a wide range of causes of intestinal obstruction is known, there are extremely rare cases of strangulated intestinal obstruction due to an inflamed appendix [Appendicitis] that have been reported [2-4]. Previous, few reported cases of intestinal obstruction due to appendicitis have tried to describe various mechanisms of the small bowel obstruction [3-7]. These mechanisms include small bowel ilues from pro-inflammatory mediators, mechanical obstruction due to a band forming appendicitis over loops of terminal ileum, and rarely, small bowel herniation through a tunnel formed by a base and tip adhesions to the posterior abdominal wall of a very long appendix. Rarely, does the appendix forms and occlude the small bowel in a form of a tourniquet ["tourniquet like"] [8]. We, therefore, report a case of strangulated intestinal obstruction due to appendiceal tourniquet with an explanation of the possible mechanism.

Case Presentation

H R is a 28-year old young man who presented with a 5 day history of sudden onset of abdominal pain which became generalized and worsened a day prior to presentation associated with abdominal distension, vomiting of bilious gastric effluent and constipation. There was no history of previous abdominal surgery. However, patient admitted haven experienced right iliac fossa, sub acute pain
sometimes 3 years back. Physical examination revealed a young man who was toxic and ill-looking with a temperature of 38.9°C, moderately dehydrated, pulse rate of 100 per minute and normal blood pressure. Abdomen was distended, tender with guarding and rigidity particularly in the region of the right iliac fossa and had normal rectal findings. The rest of the physical examination was unremarkable. Laboratory investigations such as full blood count and electrolytes were within normal limits except leucocytosis due to Neutrophilia. Plain abdominal X-ray, erect (Figure 1) and supine (Figure 2), revealed multiple air-fluid levels that were centrally located in the erect film and dilated loops of bowel in the supine film indicating small bowel obstruction.

The patient was resuscitated with intravenous fluids, prophylactic intravenous antibiotics, analgesics, nasogastric tube and urethral catheterisation. Mean while, the patient was counseled planned and prepared for emergency exploratory laparotomy.

A midline laparotomy was performed after adequate resuscitation. The intra-operative findings revealed a distended, near gangrenous loop of ileum (Figure 3) occluded by a ring of an inflamed appendix (Figure 4) with a lot of adhesions at the base of the appendix. The ring of appendix which was attached by adhesions at the base and tip was resected and loops of ileum released (Figure 5). Viability of the near gangrenous ileum was restored following a 5 minute application of gauze soaked in warm saline. The stump of the resected appendix was refashioned appropriately and a clean and dry field ensured before the abdomen was closed in layers with nylon 2/0 to skin. Post-operatively, patient had an uneventful recovery and was later discharged a week after operation. Histology report of the appendix revealed features of appendicitis. He was doing well as at last visit to surgical outpatient department SOPD, 6 month after operation.

**Discussion**

The first case of intestinal obstruction due to acute appendicitis was reported by Hotchkiss [9]. Since then a few more cases have been reported [3,4,6], elucidating better understanding of the mechanism.
and consequences of this dreaded condition. In this case, the probable mechanism may be multimodal in nature. The inflamed appendix which initially overlies loops of terminal ileum may have spread to involve the thin layers of the mesentery to the terminal ileum with subsequent formation of fibrous tissue which eventually pull the tip almost round the loops to cause a tourniquet like effect, thus, predisposing this bowel to strangulation. This evidence was supported by the presence of adhesion bands around the base of the appendix. It is also possible that the inflammation in the mesentery may have led to arterial thrombosis which resulted into the eminent strangulation that was noted during the operation of this case.

Pre-operative diagnosis of intestinal obstruction due to acute appendicitis has been very difficult and quite challenging. Most of the cases reported [6-11] previously have been diagnosed at operation, similar to the case we are reporting. This is, probably, due to the fact that the two conditions [The cause (acute appendicitis) and the caused (intestinal obstruction)] are surgical emergencies by their individual right thus, the urgency of the resulting condition does not always allow time for a thorough and complete evaluation. Usually, the course of action in emergencies such as intestinal obstruction and appendicitis is to operate and more often than not a precise preoperative diagnosis is believed not to be mandatory. The rarity and accompanied paucity of knowledge of this condition has also lent support to the challenges of making diagnosis pre-operatively.

In our case, the patient could only be diagnosed, preoperatively as a case of intestinal obstruction and this was supported by the features found on plain X-ray of the abdomen. Clinically, a critical evaluation may reveal subtle features of the cause [Acute appendicitis while the features of the caused [Intestinal obstruction] predominates [6]. In another case, the reverse may be obvious and obtainable. The most difficult to diagnose may be that entity when features of both conditions are dominant. Although, Awale et al. [7] has reported that abdominal CT scan may be a useful diagnostic imaging modality in early cases where features of inflammation of the appendix may be so obvious. In our environment, including most other places in the low and middle income countries, it may still be difficult to diagnose due to the fact that a facility such as abdominal CT scan is still expensive and have limited access. Furthermore, these patients often present late, a stage, where the inflammatory period may have gone past before they present themselves. Hence, we may still rely on a thorough history and physical examination coupled with a very high index of suspicion [12].

The intra-operative treatment of the intestinal obstruction, which is often achieved by immediate appendectomy, is very straight forward once there is no associated strangulation of the loops of bowel [2,6,13]. Even in the early part of strangulation when the viability of the loops of bowel could still be restored as it was done in the case we are reporting, the treatment by performing appendicectomy may suffice. However, when gangrene set in, segmental resection and anastomosis of the bowel, in addition to the appendicectomy may be done. On the other hand, if the gangrenous bowel is extensive and close to the ileo-caecal junction, the appropriate treatment will be to do a limited right hemicolectomy. Of course, these additional procedures may increase hospital stay, mortality and even the risk of residual morbidity if the patient eventually survives.

A very useful approach that has shown to be vital in the treatment of these cases is open laparotomy. Most previous [2-4,7] cases including the case we are reporting were treated by open surgery and through a midline skin incision. This has facilitated easy identification of both conditions and their subsequent optimal treatment. Even in situations where features of appendicitis predominated, and the initial approach was erroneously made through the regular McBurney’s point, it was thought wise to have abandoned it for midline incision. To the best of our knowledge and review of the literature, no case of intestinal obstruction due to acute appendicitis has been managed laparoscopically. However, going by the rapid advancement in laparoscopic surgery it is believed that laparoscopy holds a lot of promises to both diagnostic as well as therapeutic management of this entity.

Conclusion

Acute appendicitis is an important cause of intestinal obstruction. There are several mechanisms by which this could be achieved. Therefore a high index of clinical suspicion is key to early recognition and treatment as simple appendicectomy may just suffice.

References