Case Report

Massive Small Bowel Resection Post Infarction: How easy is the management of the resultant Short Bowel Syndrome?

Awe J.A.A1, Ugwi, V2 and Imarhiagbe, L3

1(MBBS Ibadan; FWACS; FICS; FRCS), Consultant General Surgeon and Associate Professor of Surgery.
2(MBBS Benin) Surgical Registrar; Department of Surgery.
3(MBBS Benin) Medical Registrar; Department of Medicine. College of Health Sciences, Igbinedion University, Okada, Edo State, Nigeria.

Accepted 15 April, 2014

Massive small bowel resection leaving behind a length of one hundred centimeter (100cm) or less of viable intestine as a result of massive small bowel infarction is usually carried out for a variety of reasons such as strangulated hernia, neglected post-operative intestinal adhesions or of varieties of vascular insufficiencies, that lead to reduction or total cutting off of the blood supply to the small bowel. This massive resection eventually results in what is termed the short bowel syndrome. Short bowel syndrome predominantly results in intestinal failure usually associated with a high degree of morbidity and mortality and a chronic malabsorptive state resulting in the clinical symptomatology of diarrhea, nutrient malabsorption, dysmotility, and bowel dilatation. The remaining bowel may undergo a process called adaptation, which may replace lost intestinal function. The pessimism expressed more than seventy (70) years ago concerning this syndrome is still shared by many physicians and surgeons till today. Definitive diagnosis of small bowel infarction is usually made at laparotomy. We the authors present this case of a thirty (30) year old female farmer admitted by the Obstetric and Gynecology department of our hospital as a case of suspected ruptured ectopic pregnancy but eventually found to have suffered massive small bowel infarction at laparotomy and the surgical unit was consulted while the patient was still on the operating table. The objective for presenting this paper is to warn surgeons to consider the development of bowel infarction as a complication of neglected post-operative adhesions in the differential diagnosis of acute surgical abdomen especially in females of child-bearing age with history or evidence of previous abdominal operation.

Keywords: Small Bowel, Infarction, Short Bowel Syndrome, Post-operative Adhesion.

INTRODUCTION

Intestinal ischemia and infarction (Perri et al., 2001; Ammaturo et al., 2001), is the death of part of the intestine due to its blood supply being cut off often with several possible etiologies such as strangulated hernia, neglected
post-operative adhesions, and mesenteric vascular occlusion from a wide variety of causes.

The diagnosis of this entity is usually very difficult pre-operatively until the patient is subjected to laparotomy (James et al., 2009; Perler and Brewster 1984), except in some cases caused by mesenteric vascular occlusion or in high risk patients with previous cardiac problems where there is a high index of suspicion or where angiography could be carried out at centers where such facility is available.

The average length of the adult small intestine is 6.1 meters (20.5 feet). The term massive resection has been applied to patients in whom more than 200 cm (7 feet) of small bowel has been resected. When 90 cm (3 feet) or less of small intestine remains, severe problems ensue even though the colon is intact.

Even if a portion of the colon remains, and the ileo-cecal valve with a large part of small intestine is resected, the patient's clinical status remains precarious. These patients suffer from diarrhea, steatorrhea, hypoproteinemia, weight loss, and other nutritional disturbances.

It is a very serious condition that can result in death if not treated promptly. The outlook depends on the cause. Mortality for ischemic bowel remains around 70-85% even in the best of scenarios; however a good outcome may be achieved with prompt treatment (Boncompain et al., 1991).

This is the case of a thirty (30) year-old female farmer who presented to our accident and emergency (A/E) department in a very poor clinical state with a five-day history of vaginal bleeding with passage of clots; very severe abdominal pain which was initially central but became generalized associated with general body weakness.

She was diagnosed as a suspected case of ruptured ectopic pregnancy, was immediately taken to the operating theatre but was found to have massive small bowel infarction at laparotomy.

The objective therefore of presenting this paper for publication is for all surgeons and gynecological surgeons alike to consider massive bowel infarction in the differential diagnosis of acute surgical abdomen especially in females of child-bearing age suspected to be pregnant especially in the developing world with history or evidence of previous abdominal operation (Boland et al., 2011).

Case Report

A thirty (30) year-old female farmer presented to our accident and emergency (A/E) department with a five-day history of vaginal bleeding with passage of clots; very severe abdominal pain which was initially central but became generalized associated with general body weakness. There was no associated fever, vomiting diarrhea or constipation. Her menstrual period was about three days delayed when compared with the previous one during her A/E department presentation.

Significant in her past medical history is the fact that she underwent open appendectomy three years earlier at a private clinic which the husband said was complicated post-operatively with wound infection.

On presentation in the A/E department, she had no palpable pulse and no recordable blood pressure. Her temperature was 37.6°C.

Our Obstetric and Gynecology team saw her in the A/E department during which she was found to have generally tender abdomen with severe guarding all over but more in the lower half of the abdomen.

There was a lower transverse previous abdominal scar mainly on the right side which extended a bit across the midline towards the left side.

The abdomen was generally distended and was completely silent without audible bowel sounds.

Blood samples were immediately collected for full blood count (FBC), electrolytes and urea (U/E), sample for urinalysis was collected and also specimen sent for pregnancy test in view of the bleeding and passage of blood clots per vagina as well as her delayed monthly period. Unfortunately abdominal/pelvic ultrasound was not carried out in the A/E department before sending her to the operating room because of her very poor clinical state.

Blood was also sent for urgent grouping and cross-matching.

Abdominocentesis was carried out in the A/E which revealed haemo-peritoneum.

A provisional diagnosis of haemorrhagic shock with haemo-peritoneum secondary to ruptured ectopic pregnancy was made.

Aggressive intravenous fluid resuscitation with two wide bore cannulae was commenced and the patient put on high flow oxygen by mask. Intravenous combination parenteral antibiotics were also commenced.

In view of her very precarious clinical state, the gynaecological team took her directly from the A/E department to the operating theatre for emergency exploratory laparotomy which was carried out through a lower abdominal midline incision.

At laparotomy massive small bowel gangrene was found as shown on figure 1 below. There was no ectopic pregnancy or any other gynaecological pathology found.

The surgical team was then consulted to take over the case in the operating theatre.

A further exploratory laparotomy by the surgical team revealed entire gangrene of the distal two thirds of the jejunum and ileum right down to the ileo-caecal junction (figure 2 below) caused by neglected post-operative adhesions from her previous open appendicectomy.

There was also internal herniation of the small bowel (figure 3 below).
This entire gangrenous small bowel right to the ileo-caecal junction was resected and the remaining viable jejunum was anastomosed to the ascending colon in an end to side fashion as shown on figure 4 below. The original orifice of the ileo-caecal orifice was closed in two layers and an intra-abdominal corrugated drain was left in-situ.

She ended up as a result of this pathology and operation with a short small bowel.

She had a stormy postoperative period, and transfused with six units of blood. She had early post-operative period of swinging temperature and recurrent crampy abdominal pain with diarrhea.

Her post-operative period was jointly managed with our medical team in view of her resultant short bowel and the expected nutritional problems.

She was eventually discharged home on the twenty first (21st) post-operative day. Both surgical and medical out-patient appointments and regular follow-up with the dietician that is only available at another health facility were given to her.

She remained reasonably well on her last couple of surgical out-patient follow-up even though her expected weight gain has not been too impressive because of the short bowel.

**DISCUSSION AND CONCLUSION**

The diagnosis of massive small bowel gangrene is usually very difficult pre-operatively and the definitive diagnosis is usually not made until the patient is subjected to
laparotomy except in some cases caused by mesenteric vascular occlusion or in high risk patients with previous cardiac problems where there is a high index of suspicion or where angiography could be carried out at centers where the facility is available (Van den et al., 2013).

Massive small bowel infarction is rare and has a high mortality rate. Data for small bowel infarction is scarce, but the overall mortality for acute mesenteric ischaemia is around 70 per cent (Sise 2014).

Laboratory tests may show an elevated white blood cell (WBC) count. A computerized tomographic (CT) scan of the abdomen may show abnormalities of the intestine and angiogram may be useful (Schieda et al., 2013), but none of these tests is fool proof. The only sure way to diagnose ischemic bowel is with exploratory surgery (Haddow et al., 2009).

Extensive small bowel resection as a result of massive gangrene resulting in short bowel syndrome is a very difficult clinical state to manage (Fuchs et al., 2011).

It is a very serious condition that can result in death if not treated promptly. The outlook depends on the cause. A good outcome may be achieved with prompt surgical treatment which could be carried out at one goal or as a two-staged procedure termed damage control surgery (DCS) even though a one-staged procedure was carried out in this case (Weber et al., 2014).

Pringle first described the concept of DCS in 1908 in the treatment of hepatic injuries. The technique was popularized by Stone et al. in 1983, describing packing methods for bleeding and temporary manoeuvres for intestinal and other abdominal injuries.

DCS is aimed at breaking the lethal triad of hypothermia, acidosis and coagulopathy thus allowing the patient to be quickly stabilized in an intensive care setting and this method has been utilized in many acute abdominal conditions.

Figure 4. Showing the completed anastomosis

Short bowel syndrome (SBS) resulting from this massive small bowel resection is the predominant cause of intestinal failure and is thus associated with a high degree of morbidity and mortality. One of the reasons this occurs is the dramatic reduction in nutrient absorptive capacity of the intestine especially the small bowel (Sukhotnik et al., 2004).

Of the many causes of SBS, the most common cause is extensive surgical resection secondary to massive infarction. The impressive ability of the bowel to adapt functionally and morphologically is critical for decreasing morbidity and mortality in these patients. (Lennard-Jones and Wood 1991; Keller et al., 2004).

The length of residual small bowel, type of anastomosis as well as if the ileo-cecal valve was not resected strongly affect survival and outcome of patients who have undergone massive intestinal resections.

The average length of the adult small intestine is 6.1 meters (20.5 feet). The term massive resection has been applied to patients in whom more than 200 cm (7 feet) of small bowel has been resected or when 90 cm (3 feet) or less of small intestine remains, severe problems ensue even though the colon is intact.

Also when a portion of the colon, and especially the ileo-cecal valve, is resected in addition to a large part of small intestine, as it happened in our case the patient's clinical status may be precarious. These patients suffer from diarrhea, steatorrhea, hypoproteinemia, weight loss, and other nutritional disturbances.

Parenteral nutrition (PN) remains of great importance in post-operative care of these patients.

The remaining bowel may undergo a process called adaptation, in an attempt to replace lost intestinal function (Weale et al., 2005). The degree of adaptation is vital in
decreasing the dependence on PN and for improving patient quality of life and long-term outcome.

Proposition of appropriate and sufficient nutritional and fluid support is essential for the management of these patients (Jackson and Buchman 2005; Gillanders et al., 1990; Ladefoged et al., 1996; Undaram et al., 2002). The primary goal is to prevent or eliminate the need for PN.

Recent developments have promoted a greater understanding of the process of intestinal adaptation (Whang and Shen 2001). Various intestinal trophic factors have also been recognized as treatment modality. (Byrne et al., 1995). These efforts have led to the early development of hormonal therapy to stimulate intestinal adaptation and enhance intestinal absorption.

Intestinal transplantation remains a formidable option for those who have developed life-threatening complications from PN and cannot be managed using more conservative techniques (Fink and Olson 1967).

Small bowel transplantation (Goulet et al., 1992; Pinna et al., 2000; Langnas et al., 2000), as a modality for treating massive small bowel resection should involve carrying out evaluation of the gastro-intestinal tract anatomy, assessment of hepatic function, vascular patency, infection history and immunologic status, psychosocial evaluation as well additional consultations with other related disciplines are mandatory steps that should be followed before the transplant is eventually carried out.

The outcome of the intestine transplantation evaluation is determined through a multidisciplinary review, and recommendations are discussed with the family at the conclusion of the evaluation (Sudan et al., 2000; Roberts et al., 2000), process.

If a patient does not meet these listing criteria, recommendations for care with an alternative management plan are then discussed with the family.

From the fore-going the diagnosis of massive small bowel gangrene pre-operatively is very difficult except in some few cases: prompt surgical intervention either as a one-staged or two staged (DCS) procedure is essential. bowel gangrene pre-operatively is very difficult except in some few cases; prompt surgical intervention either as a one-staged or two staged (DCS) procedure is essential.

With successful surgical outcome the resultant short bowel syndrome is equally if not more difficult to manage than the original pathology of massive bowel infarction because the overall quality of life is actually debatable.

REFERENCES


