International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Gelfoam Induced Adhesive Intestinal Obstruction

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Abstract: ***Postoperative adhesive intestinal obstruction is a known entity, but the use of gelfoam for control of intraoperative bleeding being responsible for the same is extremely rare. Only a few cases have been reported in literature. We present a case of postoperative adhesive intestinal obstruction due to gelfoam used intraoperatively for hemostasis during hysterectomy, which necessitated exploratory laparotomy. A brief case report along with discussion and review of literature is presented herewith.***

Keywords: Gelfoam, Hysterectomy, Adhesive intestinal obstruction, exploratory laprotomy

1. Introduction

Postoperative adhesions are common causes of intestinal obstruction after abdominal surgeries including gynaecological operations. An adhesion induced by a foreign body in peritoneal cavity is a rare occurrence. Use of gelfoam for control of intraperitoneal ooze causing adhesions leading to early postoperative intestinal obstruction is extremely unusual.We encountered a rare case of postoperative intestinal obstruction following the use of gelfoam during hysterectomy for intraoperative bleed, which necessitated an exploratory laparotomy on sixth post operative day of the surgery.

2. Case Report

A 45 year old female was operated for abdominal hysterectomy for multiple uterine myomas. Oral fluids were started on third postoperative day despite sluggish peristalsis, following which she developed vomitting and abdominal distension, for which she was referred to the surgical unit the next day. On examination abdomen was distended with sluggish peristalsis. Erect abdominal Xray showed multiple air-fluid levels in the small intestinal loops. Conservative management including nasogastric aspiration along with fluid and electrolyte correction was instituted which failed to improve the patient. Xray done on fifth postoperative day showed increase in the air-fluid levels. CT-scan performed on the same day showed distended ileal loops with a localized fluid collection in pelvic region, suggestive of a mechanical intestinal obstruction. In view of failure to respond to the conservative method of treatment, the patient was taken for exploratory laparatomy on the next day.

Exploration of the abdomen revealed 2-3 loops of kinked terminal ileal loops stuck in the pelvic cavity along with distended proximal ileal coils. It also revealed fibrous adhesions of the ileal coils to the side wall of pelvis and to the hysterectomy site, along with a disintegrating mass of tissue which was present amidst the adhesive bands, causing the kinking of coils and the subsequent obstruction (Fig.1). The mass was carefully dissected out, the adhesions released carefully and the obstruction was relieved (Fig.2). On further examination, the mass turned out to be the disintegrating gelfoam tissue which was used during the hysterectomy to control the oozing of blood from the pelvic area. The patient made a smooth postoperative recovery and discharged later. The histopathological examination confirmed the nature of the tissue intermingled with inflammatory cells. Follow up of six months has shown her to be symptom and disease free.

3. Discussion

Postoperative intestinal adhesions develop in 93% of patients having previous abdominal surgery (1).and are responsible for 49-74% cases of small bowel obstruction, occurring commonly after appendicectomy, gynaecological surgeries and other intestinal operations (2).Menzies et al have found out that 39% of these cases occured within 1 year of abdominal surgery and 21% within 1month (1). Postoperative adhesions occur in 60-90% of patients after major gynaecological surgeries and the incidence of adhesion related obstructions after surgery for benign conditions without hysterectomy is 0.3%, increasing to 3% in patients who underwent hysterectomy (3).Incidence of small bowel obstruction is 16.3% per 1000 hysterectomies, but only 5 per 1000 after caesarian section (4).

Following peritoneal injury, fibrinous bands develop between abutting surfaces within few hours of surgery, due to extravasation of serum and cellular elements and the fibrinolytic system is triggered to lyse these bands within 72 hours after the insult. Disruption of existing equilibrium between fibrin and fibrinolysis leads to persistence of the bands which then become infiltrated by proliferating fibroblasts. Subsequently vascularisation and cellular ingrowth occurs creating the adhesions (2).Tissue ischemia, thermal injury, foreign body reaction and infection are the factors responsible for impaired fibrinolysis, promoting the adhesion formation (3).Various measures suggested for prevention of adhesions are minimal tissue abrasions to the peritoneum, avoidance of introduction of foreign material such as talc in the operative field, use of nonabsorbable or delayed absorbable sutures rather than absorbable reactive catgut and meticulous hemostasis (2). Laparoscopic surgery appears to be less prone to the development of adhesions

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due to lack of use of retractors and packs during surgery, maintenance of closed abdomen with subsequent reduction in peritoneal dryness, less likelihood of introduction of foreign bodies, and reduced likelihood of blind manual dissection of adhesions, all contributing to less tissue damage (2).

Many adjuvants are now available to complement the traditional methods of hemostasis such as suturing and electrocautery. They include oxidized cellulose (surgicel), gelatin sponges (gelfoam) and microfibrillar collagen (avitane), all of which are absorbable (1). Gelfoam (absorbable gelatin) sponge is a water soluble porous product prepared from purified pork skin, which is able to hold blood and other fluid within its interstices and its hemostatic properties are more physical than alteration of clotting mechanism. The effect is also due to release of thromboplastin from the damaged platelets interacting with prothrombin and calcium to form thrombin in its interstices to produce clot formation, by its action on fibrinogen in blood. The spongy physical property of the sponge hastens clot formation providing structural support for the clot. It becomes liquefied within a week and gets absorbed within 4-6 weeks. It should be applied to the bleeding surface with moderate pressure and only minimum amount required for the same is used, excess being always removed. It is used in capillary or venous bleeding not otherwise controlled by conventional methods and is not used in closure of skin incisions or in intravascular compartments. No mention has been done in the information literature about the development of intestinal obstruction following its use in abdominal operation (5). Gelatin plus hemostatic kit includes thrombin dried powder and saline in addition to the sponge, enhancing its hemostatic action.

Other biologic agents include Floseal, Coseal and bovine thrombin, which cause activation of clotting cascade to achieve hemostatsis and are increasingly used in laparoscopic surgey. Floseal matrix consists of bovine derived gelatin matrix component needing blood for activation. The adverse effect of these agents includes anemia, infection, hypotension, arrhythmias or coagulopathy (6). Various adhesive substances are used in surgery such as cynoacrylate glue, fibrin glue (fibrinogen and thrombin) and thrombin for tissue adhesion, suture support and sealing of body cavities including subarachnoid space and endoscopically for treatment of bleeding (2). Small bowel obstruction has been reported previously in 2 case reports, both in gynaecological operations (8, 9). Benjamin clapp et al has reported small bowel obstruction after Floseal use in 3 patient after laparoscopic procedures including hysterectomy (6). Ours is only the forth case report of postoperative adhesive intestinal obstruction following the use of gelfoam during surgery.

Reason for such products leading to development of early postoperative adhesive obstruction is probably the immediate postoperative bowel stasis in presence of postthrombotic agents such as gelatin matrix (6). The gelatin granules swell as they absorb blood, and fibrin monomers polymerise along this surface causing a hemostatic plug due to activation of factors 5, 8 and 13, converting fibrinogen to fibrin (6). Only gelatin based products such as gelfoam are implicated as a nidus for infection and abscess formation. In all the previously reported cases, the small bowel obstruction has developed within the first week of surgery, due to intition of eosinophil-rich inflammatory response to the tissue. The gelatin matrix is not completely absorbed for 6 weeks and the maximum inflammatory response is between 7 to 10 days, which could be the causative factor leading to the early postoperative intestinal obstruction, in addition to other factors like extensive tissue handling and use of electrocautery during surgery (6).

Thus it is apparent that the use of hemostatic products like gelfoam or floseal during open or laparoscopic operation can lead to the development of local intense inflammatory reaction causing adhesions of small intestinal coils to the site and subsequent obstruction, necessitating open or laparoscopic intervention for adhesiolysis. This is particularly of importance in pelvic cavity especially after gynaecological operations, where the presence of small intestinal coils with impaired peristalsis can lead to early postoperative adhesive obstruction. Also the adherence of other precautions like minimal handling of tissues, meticulous surgical technique with appropriate hemostasis and aseptic precautions is of paramount importance. Use of products like gelfoam for hemostasis in the peritoneal cavity during abdominal operatios is to be avoided as far as possible to avoid this extremely rare complication.

4. Conclusion

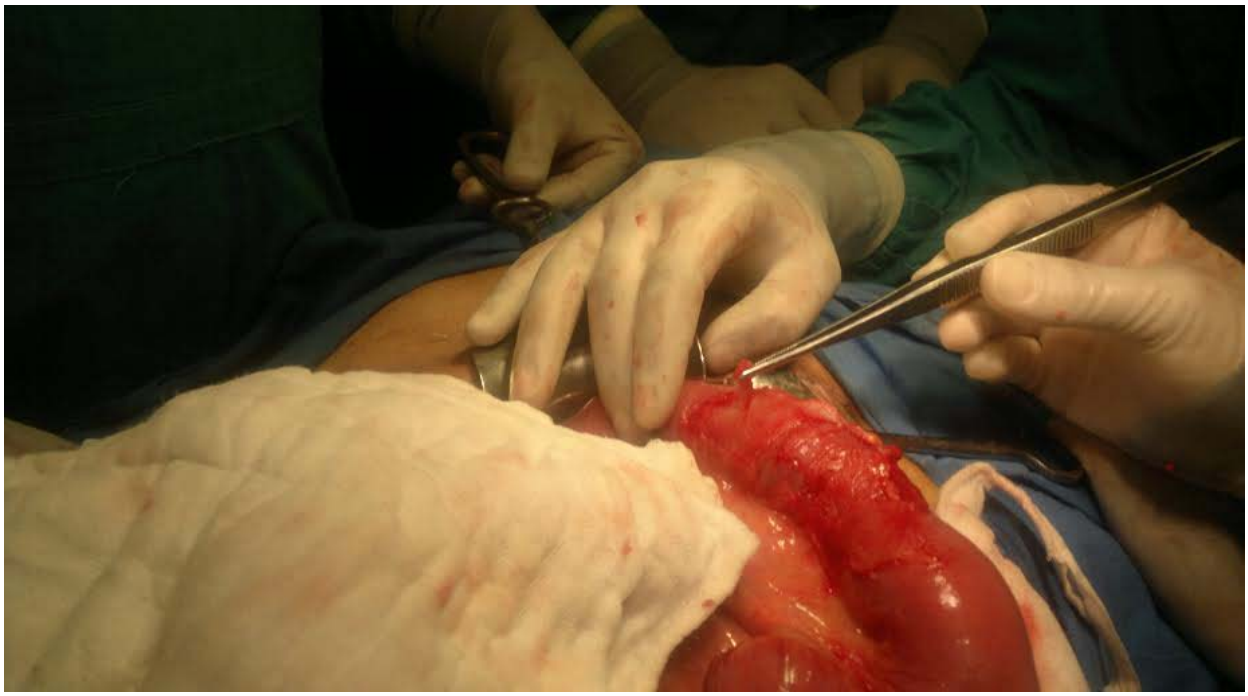
Development of postoperative adhesive intestinal obstruction secondary to the use of materials like gelfoam for hemostasis during open or laparoscopic abdominal surgeries, including gynaecological operations, has come to light now as a new distinct entity. Although it is still extremely rare and this being only the forth such report in the available literature, it is advised that the use of such products is to be avoided as far as possible, and that to with extreme care, to avoid this potentially dangerous complication of adhesive intestina lobstruction following its use.

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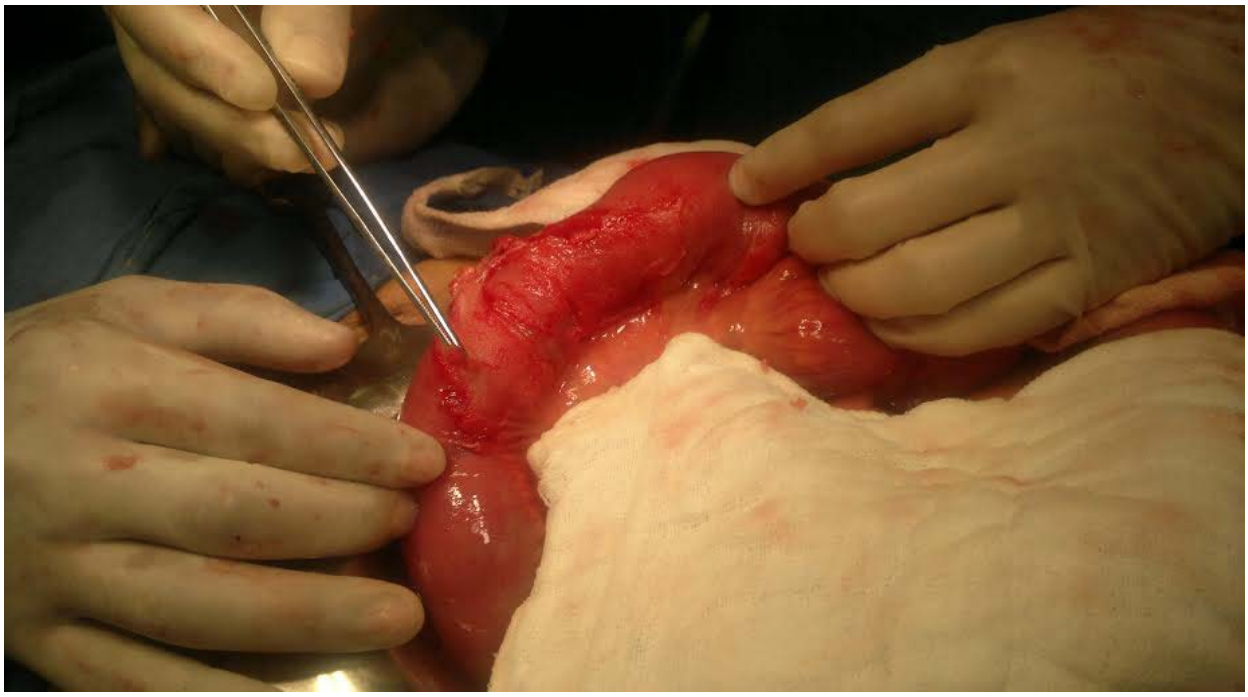
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Operative Photograph -1



Operative Photograph - 2

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