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Vacuum Assisted Closure (VAC): A Promising Therapeutic Tool for Enterocutaneous Fistulas

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Abstract
Managing an enterocutaneous fistula continues to pose the greatest challenge to the general surgeon. Aggressive supportive care is pivotal in managing these patients. Vacuum assisted closure (VAC) therapy is a promising therapeutic tool for such patients. It undoubtedly helps in closure of the fistula thus avoiding the high morbidity and mortality associated with surgical intervention. A case of a complex enterocutaneous fistula treated by VAC therapy is presented.

Keywords: *Enterocutaneous fistula, vacuum assisted closure treatment*

Introduction

Entrocutaneous fistula (EC) is one of the most catastrophic complications of the abdominal surgery. The etiology may vary from inflammatory bowel disease to iatrogenic. Extensive research has and continues to be done to develop the best treatment for enterocutaneous fistulas. Despite the advances in skin care, nutrition and management of electrolyte imbalance, yet morbidity and mortality associated with EC fistulas is extremely high .Vacuum assisted closure (VAC) is evolving as an alternative modality for treatment of these fistulas. A case of entrocutaneous fistula following exploratory laparotomy for strangulated incisional hernia managed by VAC therapy is reported.

Case Report

A 62 year old male patent presented with a large midline incisional hernia of 7 years duration. The hernia had increased over a period of time and become irreducible. The hernia swelling was multi-loculated on palpation. The patent was admitted for preoperative assessment prior to definitive surgical intervention. However during the course of admission the hernia got obstructed requiring urgent surgical intervention. The peritoneal cavity was accessed through the papery thin scar of previous surgery taking utmost care to avoid damageto the underlying adherent loops. The adhesions were dense, some of which were almost inseparable. Adhesiolysis caused serosal injuries at few places which were repaired.

Resection anastomosis was done to remove the inseparable portion of the bowel. Since there was extensive of loss of domain only cutaneous closure could be achieved. The patent developed wound dehiscence with exposure of intestinal loops. Since there were no surgical options available to close the abdomen, the patient was managed conservatively with occlusive dressings. The right drain on the 6th post operative day started draining bile stained fluid. (400 ml per day) Whereas the pelvic drain started draining feculent content one day after the bile leak started. There were some amount of leakage from the dehisced laparotomy wound. Thus it became a classic case of a combined entro-cutaneous and entro- atmospheric fistula. Adequate skin care, correction of fluid and electrolyte imbalance, hyper alimentation were commenced promptly. For the tube drainage on either side a 14F Ryle's tube was passed through each of tubes and continuous low grade negative suction was applied making it sump drain pattern. Within 3 days of this therapy the right sided bile leak stopped completely. Whereas the left sided feculent leak still continued. As the consistency of the effluent was thick, the suction force used could not act adequately on the part of the intraperitoneal cavity next to the drain tube. As a result the output of the entero-atmospheric (EA) fistula increased significantly. To tide over the wound management crisis a large stoma bag or wound management system encompassing the entire length and breadth of the gaping laparotomy wound was applied meticulously ensuring air tight adherence of bag to the skin. (Figure 1)Negative suction tube was connected through the nozzle provided. (Figure 2) The patent was shifted over to oral hyper alimentation in view of the distal location of the fistula as evident by the grossly feculent effluent.

The output from the entero atmospheric fistula as collected in the bag decreased over the next 4 weeks and eventually stopped. The patient in the meantime had started passing stool per rectally. Though the fistula stopped draining, there was no possibility of primary closure of the laparotomy wound. Sterile Vaselinegauze dressings were given. This resulted in extensive granulation tissue developing over the defect which epithelized over a period of time. (Figure 1) However the granulation tissue during the course of cutaneous epithelization was secreting a lotof tissue fluid adding to the complexity of wound management. Hence hypertonic saline dressings were started in order to reduce fluid exudation and stimulate fibrosis.

The skin healed completely with good amount of scar tissue within 4 weeks of cessation of fistula discharge.

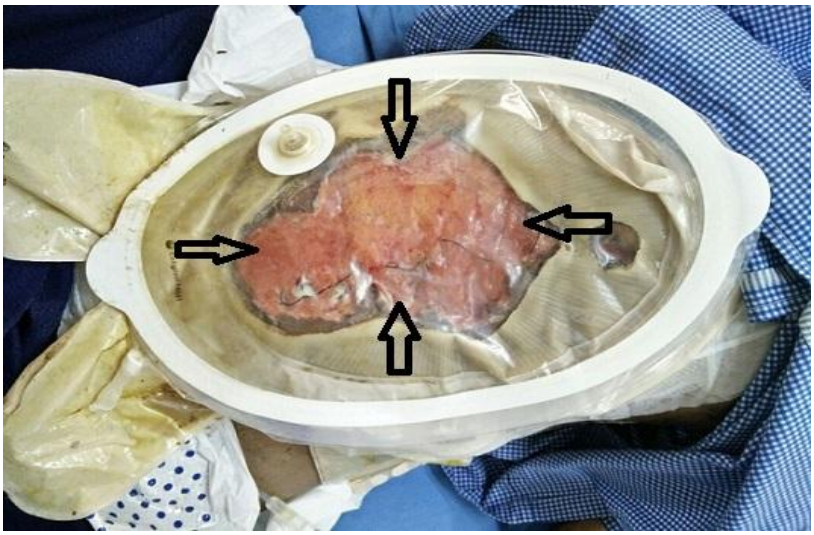

Figure 1 Completed wound dehiscence managed by VAC therapy showing good granulation tissue marked by the black arrows.

Figure 2 Wound management system used showing the nozzles marked by colored arrows(red and black)used for applying negative suction.

Discussion

Enterocutaneous Fistula (EC) is one of the most complex entities in GI surgical practice. Supportive care still continues to be the gold standard for management. Early& aggressive surgical intervention is usually associated with more complications and very high mortality. The standard principles for managing a EC fistula continues to remain the same with anatomical localization of the site of the bowel from which the fistula originates, status of the distal tract of the bowel, care of skin, aggressive hyper alimentation and meticulous correction of fluid and electrolyte imbalance. [1] Even with the best of aforementioned modalities of treatment the natural course of the EC fistulas continues to remain unpredictable. Some fistulas may close whereas others may continue to drain. The advent of vacuum assisted therapy (VAC) has given tremendous impetus to the successful management of EC fistulas without aggressive surgical intervention. VAC therapy was initially tried out on non healing wounds. The positive effects of VAC therapy on wounds was phenomenal and delivered spectacular results.[2] These included active removal of excess interstitial fluid from the tissues thereby decompressing the tissues and allowing increased blood flow and oxygenation. Improved blood flow in turn stimulates the growth of healthy granulation tissue. [3] This provides an excellent environment for healing of broken down bowel tissue. Partially dehisced intestinal anastomoses do exceedingly well with VAC therapy. VAC therapy renders the area absolutely dry thereby reducing cutaneous complications thus allowing healing of the surrounding eroded skin. This also provides a positive feedback to the patients' psyche which is a very important factor in recovery. Patient's suffering from EC/EA fistula experience a feeling of invalidity and hopelessness which is significantly reversed by decrease in the fistula output, improvement in skin condition leading to the great hope for healing. [4]

As the tissue oxygenation by the way of improved circulation improves, anaerobic organisms are significantly reduced thereby reducing the septic load at the site of the fistula. However the time required for a positive response may vary from patient to patient depending upon a number of factors. [4]

Fistulas which originate higher up in the bowel are usually high output in nature (more than 500 cc /day) requiring more time to be controlled whereas fistulas arising more distally respond faster. The size of the defect in the bowel is also an important determinant in post anastomotic dehiscence. For EC fistulas some amount of circumferential bowel continuity is necessary. If there is no such continuity then there are chances of failure to heal. Hence anatomical delineation of the origin of fistula is a very important factor which determines the therapeutic prognosis of VAC therapy. Various mathematical computational models have been developed to study this phenomena but not all the results from these models are promising. [5]

Controversies stills surrounds the pressure &duration which needs to be used for VAC therapy.[6] There is no clear consensus on the amount of pressure to be applied and the duration.

In the case presented low pressure suction was applied intermittently. (Approximately 75 mm of HG)It was applied for one hour alternating with no vacuum amounting to 12 hours per day. The fistula on the right side which contained bile in the case presented responded within 24 hours. By day 3 the fistula output was almost nil. However the fistula on the left side ((feculent) took more time as the tube got blocked converting an EC fistula to an EA fistula. The use of a special stoma bag system is of great help as it is available with a prefixed nozzle to which negative suction can be applied. In the event of such a bag not being available a tailor made Bogota bag may also suffice. In the past EC and EA fistulas were associated with a dismal prognosis. However this therapy has greatly revolutionalised the management of both EC and EA fistulas with survival statistics steadily improving over a period of time.

Conclusion

Enterocutaneous fistula is one of the most complex surgical problems in practice. Supportive care along with commencement of VAC therapy holds a great promise for cure.

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References

1. Evenson AR, Fischer JE. Current management of enterocutaneous fistula. J GastrointestSurg 2006; 10: 455-464.
2. Vagholkar K. Negative Pressure Wound Therapy: A Promising Weapon in the Therapeutic Wound Management Armamentarium. Journal of Medical Science and Clinical Research. 2014; 2 (6); 1314-1319.
3. Orgill DP, Bayer LR. Negative pressure wound therapy: past, present and future.Int Wound J. 2013;10: 15-19
4. Turegano F, Garcia Marin A. Anatomy based surgical strategy of gastrointestinal fistula treatment. Eur J Trauma EmergSurg 2011; 37: 233-239.
5. Cattoni DI, Chara O, Vacuum effects over the closing of enterocutaneous fistulae: a mathematical modelling approach. Bull Math Biol. 2008; 70: 281-86.
6. Wainstein DE, Fernandez E, Gonzalez D, Chara O, Berkowski D. Treatment of high output enterocutaneous fistulas with a vacuum compaction device. A ten year experience. World J Surg 2008; 32:430-435.