VACUUM-ASSISTED PERITONEAL DRAINAGE
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Key points
- Vacuum-assisted abdominal drainage has been reported in both human and veterinary medicine
- Methods for application of the “dressing” for vacuum-assisted abdominal drainage vary
- Vacuum settings range from -75 to -125 mmHg
- Mortality rates in cases of peritonitis secondary to perforation of the gastrointestinal tract treated with vacuum-assisted abdominal drainage are similar to other methods of abdominal drainage
- Large prospective randomized studies are needed both in human and veterinary medicine to establish the efficacy and optimal application of vacuum-assisted drainage in cases of secondary peritonitis

In veterinary medicine, secondary peritonitis, severe peritoneal inflammation that has developed as a result of another primary condition, is most commonly due to a disruption of the gastrointestinal tract. The mortality rate associated with secondary peritonitis is significant with reports from 30% to 70% in human medicine.\(^1\) The primary goal of surgical treatment of secondary peritonitis is correction of the underlying etiology. However, the optimal method for the provision of ongoing abdominal drainage following initial surgical intervention remains a debate in both human and veterinary medicine.

Strategies for management of secondary peritonitis following initial surgical intervention in human medicine include; 1) relaparotomy, either planned or on-demand\(^2\), 2) open abdominal drainage, utilizing mesh or synthetic patch, saline-soaked towel packing, or the Bogota bag,\(^3\) 3) and vacuum-assisted closure/drainage.\(^1,4,5\) Abdominal drainage strategies utilized in veterinary medicine are similar and also include the use of active drains.\(^6\) Each of these drainage techniques has disadvantages. Major drawbacks of relaparotomy are the lack of well-defined criteria for timing of relaparotomy, the need for multiple anesthetic episodes, and the cost of multiple surgical procedures. Open abdominal drainage techniques frequently result in hypoproteinemia, are labor intensive because of the need for frequent bandage changes, carry a greater risk of ascending infection, require a second anesthetic episode and are also associated with significant expense.

The use of vacuum-assisted abdominal drainage (VAC) has been utilized both in human and veterinary medicine.\(^1,4,7\) Use of VAC for abdominal drainage has the advantages of visualization and quantification of draining fluid, decreased frequency of required dressing changes when compared to patients with traditional open abdomen, and greater patient mobility.

Randomized prospective studies in which patient inclusion criteria have been standardized have not been performed in either human or veterinary medicine and many questions remain regarding mortality rates in comparison to other abdominal drainage techniques, complications associated specifically with VAC use for abdominal drainage, ideal vacuum setting when used in an open abdomen and optimal strategy for VAC bandage configuration and placement.
Mortality rates in patients receiving VAC therapy compared with other methods of abdominal drainage in cases of secondary peritonitis are similar. Perez et al., reported a 37% in hospital mortality rate in people undergoing vacuum assisted abdominal drainage. Boute et al., reported 50% mortality in the only veterinary report of VAC application for open abdominal drainage in veterinary medicine.7

Concerns have been raised regarding possible complications, including the development of bowel fistulas secondary to the constant negative intraabdominal pressure and hypoproteinemia, associated with abdominal drainage utilizing the VAC. When recent studies utilizing VAC abdominal drainage techniques were compared to the use of mesh for maintaining abdominal drainage in people, the rate of development of bowel fistulas was similar, 3% in VAC patients and 4% in patients receiving polytetrafluoroethylene mesh.1,8 Schmelzle et al., found that in long-term vacuum-assisted closure in open abdomen due to secondary peritonitis the occurrence of enterocutaneous fistula could not be attributed to the duration of VAC therapy, but rather to the severity of underlying disease and the need for multiple re-explorations.5 Additionally, VAC application has been documented in the treatment of enterocutaneous fistulas.9

Application techniques for the use of the VAC in abdominal drainage vary. The initial report of this technique in veterinary medicine reports placement of the foam directly between the edges of the fascial incision with no barrier between the bowel and the foam.7 In human medicine, reports of techniques for application of the VAC vary. The placement of a smaller polyurethane sponge and plastic barrier directly into the abdominal incision subsequently covered by a larger polyurethane sponge and plastic barrier has been reported.1 Other application techniques include the placement of laparotomy sponges into the abdominal cavity as a barrier between the polyurethane sponge and the bowl or both vicryl mesh and petroleum impregnated gauze placed between the bowel and the polyurethane sponge.5 Case numbers and follow-up information are insufficient to determine an optimal application technique. Vacuum settings ranging from -50 to -125 mm Hg have been reported in cases of abdominal application of the VAC system.1,4,7 Controlled studies have not been performed to establish the optimal vacuum setting.

The use of vacuum-assisted abdominal drainage may have benefits related to ease of patient care, patient comfort, and relative decreased frequency of bandage changes when compared to other open abdominal drainage techniques. However, there is much work to be done to define the optimal application technique and efficacy patients with secondary peritonitis.


