Can use of a vacuum dressing reduce postoperative complications in dogs and cats?

Negative pressure wound therapy (NPWT) is a therapeutic technique which uses a vacuum dressing to promote wound healing. An adhesive sealed dressing is used connected to an adjustable vacuum source which allows the controlled application of sub-atmospheric pressures to the local wound environment. NPWT has been shown to positively manipulate tissue growth and remove excess fluid from wounds both of which facilitate healing. In humans it has been used to manage complex wounds including those with exposed bone, tendon or metallic implants, acute burns and to increase success rates following skin grafting. In the veterinary field similar uses, albeit in smaller numbers have been reported. While most studies have concentrated on the use of NPWT for open wounds, some recent literature in humans indicates that similar favorable effects should exist for surgical wounds which have been closed but which are draining.

Certain postoperative wounds are recognized to be associated with more complications than others and may be termed high-risk. Examples in humans include wounds following certain tibial fractures, calcaneal fractures and median sternotomies such as would be performed for coronary artery bypass surgery. In animals examples include wounds following high-energy fractures and following arthrodesis (joint fusion) surgery which is sometimes necessary to relieve intractable joint pain. Problems associated with wound healing can lead to complete breakdown of the surgical incision, infection and the requirement for further surgical procedures.

Recent studies in humans investigated the use of NPWT over some of these high-risk incisions and beneficial effects were noted including decreased drainage, decreased incidence of wound breakdown, decreased infection rates and improved wound healing. It was also postulated that NPWT may decrease the pain and swelling associated with these wounds. The use of NPWT over high-risk closed-incisions to ameliorate complications had never been reported in the veterinary field prior to this study.

The study involved twenty dogs and cats which had sustained high-energy fractures requiring stabilization or which required joint arthrodesis. The cases were randomized to one of two groups – group one received NPWT for 24 hours postoperatively while group two received a compressive support dressing as the current standard of care. Other than this all cases were treated identically. The limb circumference at six different sites was measured to assess severity of swelling preoperatively and at 24 and 72 hours postoperatively. All cases received a standardized program of pain relief and their pain level was assessed using a standardized scoring system at 24, 48 and 72 hours postoperatively. Wound discharge was assessed at 24 and 72 hours postoperatively. Any complications were noted and differences between the two groups were assessed.

The percentage change in limb circumference between preoperative and both 24 and 72 hours postoperative measurements were significantly less in the NPWT group indicating that they

sustained significantly less swelling. The discharge score was also significantly lower in the NPWT group at 24 hours postoperatively. No differences in the pain scores or the complication rates were noted.

This initial study demonstrates significant benefits to the use of NPWT over high-risk surgical incisions in terms of reduced swelling and wound discharge. Following a larger study, the authors anticipate that these benefits may well translate into a reduction in wound-associated complications, specifically wound breakdown and infection. Other benefits may include reductions in pain and the frequency of dressing changes required. The authors are in the process of continuing this study to include more cases which, based on sample size calculations, should allow the impact of NPWT on these other factors to be assessed.

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Publication

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