An assessment of clinical, biometric, cosmetic and microscopic outcomes of four suture techniques for cutaneous closure of laparotomy wounds: an experimental study in rabbits

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Abstract:

The purpose of this study is to identify a suture technique that provides superior cosmetic outcomes and proper wound healing for skin closure after midline laparotomy of small animals in a rabbit model. This study also attempts to clarify the role of selected four suture patterns in wound healing, wound complications, cosmetic impacts and histopathology on the laparotomy skin wound. Twenty four female rabbits of white New Zealand and California breeds were used for this experimental study. Four suture patterns were compared for cutaneous closure of a 7 cm midline laparotomy wound, classified as: buried continuous subcuticular–intradermal (BCSID), interrupted cruciate mattress (ICM), running horizontal mattress (RHM), and far–near–near–far (FNNF). The different groups were studied in terms of clinical findings, wound and suture biometrics, cosmetic assessment, microscopic examination, and statistical analysis. RHM presented a ‘very good’ cosmetic grade on a 6-element scale, clinically associated with rapid successful wound healing, and no complications. BCSID was superior in cosmetic terms among the tested groups where it showed an aesthetically ‘excellent’ score. However, the technique was not efficient enough to prevent wound dehiscence in some cases. ICM demonstrated a ‘very good’ cosmetic degree but was not functional enough to prevent invasive contamination or infection in certain instances. FNNF was the inferior among all groups in regards to the cosmetic outcomes but was characterized by successful, slowly-progressive healing. Suture-to-wound length (SL: WL) ratio of all groups seemed to have a correlation with the rate of wound dehiscence as wound dehiscence is unlikely to occur if a SL: WL ratio is more than 4:1. The microscopic results proved that the RHM suture pattern was the favourable technique. RHM can be concluded as the suture technique of choice for cutaneous closure of laparotomy wounds in small animals like rabbits. It serves as a compromise of high-quality cosmesis and optimal wound healing. The assessed suture techniques can be graded in a descending order from the superior to the inferior cosmetically as BCSID>RHM>ICM>FNNF, and histopathologically as RHM>FNNF>BCSID>ICM. Clinical trials are needed to be performed to validate and reproduce the outcomes of this study on canine and feline patients.

Keywords:

cosmetic surgery, suture technique, wound healing, laparotomy, histopathology

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