Closure of Midline Abdominal Incisions with Small Stitches

Studies on Wound Complications and Health Economy

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Akademisk avhandling

som med vederbörligt tillstånd av Rektor vid Umeå universitet för avläggande av medicine doktorsexamen framläggs till offentligt försvar i Aulan, Länssjukhuset Sundsvall-Härnösand, hiss 8, plan 1 tisdagen den 5 juni, kl. 13:00.
Avhandlingen kommer att försvaras på svenska.

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Abstract

Background: A midline incision inflicts minimal damage to muscles, nerves and blood supply. Postoperative complications cause patients suffering and costs for society. Midline incisions should be closed with a continuous single-layer technique and a suture length (SL) to wound length (WL) ratio over 4. It has been recommended to place stitches at least 10 mm from the wound edge. Recent studies, taking the SL to WL ratio into account, have shown that a stronger wound is produced with small stitches placed closer to the wound edge.

Aims: The aims were to study the rate of surgical site infection (SSI) and incisional hernia in relation to the use of small or large stitches; to study the effect of the SL to WL ratio and other risk factors for SSI and incisional hernia in relation to the size of stitches; and to study if the use of small stitches generates cost savings.

Methods: In a non-randomised study, 1991 to 1993, the patients having their midline incisions closed with an SL to WL ratio over 4 were selected. The rate of SSI and incisional hernia was analysed in relation to stitch length (SL/number of stitches). In a randomised trial, 2001 to 2006, patients were randomised to closure of midline incisions with small stitches, placed 5 to 8 mm from the wound edge, or large stitches placed at a distance of at least 10 mm. Patient and operative characteristics were recorded. The rate of SSI and incisional hernia was studied and risk factors were analysed. The proportion of patients subjected to an incisional hernia repair was identified. The mean cost for a hernia repair during 2010 was calculated. A cost analysis was performed.

Results: In the non-randomised study 368 patients were analysed. The lowest rate of SSI and incisional hernia was with a short stitch length. In the randomised trial, 356 patients were closed with small stitches and 381 with large. With small stitches SSI occurred in 17 of 326 patients (5.2%) and with large stitches in 35 of 343 (10.2%) (p=0.02). With small stitches incisional hernia was present in 14 of 250 patients (5.6%) and with large stitches in 49 of 272 (18.0%) (p<0.001). With small stitches, no risk factors could be identified. The rate of incisional hernia was lower with an SL to WL ratio over 4. A very high ratio did not affect the complication rates. With small stitches there was a cost for a longer suturing time, but a cost reduction of 1339 SEK was generated from the societal perspective for each closure compared with large stitches.

Conclusions: In midline abdominal incisions closed with a continuous single-layer technique the rate of SSI and incisional hernia is lower with small stitches than with large. The rate of incisional hernia is lower with an SL to WL ratio over 4 and increasing the ratio very much above 4 does not increase the rate of complications. With small stitches no risk factors for the development of SSI and incisional hernia can be identified and cost savings are generated. The previous recommendation to use large stitches should be changed to recommend small stitches.

Keywords

Wound closure techniques, Postoperative complications, Surgical wound infection, Surgical wound dehiscence, Hernia, Costs, Cost analysis