Wound edge protectors in open abdominal surgery to reduce surgical site infections: a systematic review and meta-analysis.

Abstract: Surgical site infections remain one of the most frequent complications following abdominal surgery and cause substantial costs, morbidity and mortality. To assess the effectiveness of wound edge protectors in open abdominal surgery in reducing surgical site infections, a systematic literature search was conducted according to a prespecified review protocol in a variety of data-bases combined with hand-searches for randomized controlled trials on wound edge protectors in patients undergoing laparotomy. A qualitative and quantitative analysis of included trials was conducted. We identified 16 randomized controlled trials including 3695 patients investigating wound edge protectors published between 1972 and 2014. Critical appraisal uncovered a number of methodological flaws, predominantly in the older trials. Wound edge protectors significantly reduced the rate of surgical site infections (risk ratio 0.65; 95%CI, 0.51-0.83; p = 0.0007; I² = 52%). The results were robust in a number of sensitivity analyses. A similar effect size was found in the subgroup of patients undergoing colorectal surgery (risk ratio 0.65; 95%CI, 0.44-0.97; p = 0.04; I² = 56%). Of the two common types of wound protectors double ring devices were found to exhibit a greater protective effect (risk ratio 0.29; 95%CI, 0.15-0.55) than single-ring devices (risk ratio 0.71;
95%CI, 0.54-0.92), but this might largely be due to the lower quality of available data for double-ring devices. Exploratory subgroup analyses for the degree of contamination showed a larger protective effect in contaminated cases (0.44; 95%CI, 0.28-0.67; \( p = 0.0002, I^2 = 23\% \)) than in clean-contaminated surgeries (0.72, 95%CI, 0.57-0.91; \( p = 0.005; I^2 = 46\% \)) and a strong effect on the reduction of superficial surgical site infections (risk ratio 0.45; 95%CI, 0.24-0.82; \( p = 0.001; I^2 = 72\% \)). Wound edge protectors significantly reduce the rate of surgical site infections in open abdominal surgery. Further trials are needed to explore their effectiveness in different risk constellations.