



Open versus Closed Surgical Incision in Class III and IV Surgical Wounds after Emergency Laparotomy

A Meta-analysis



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INTRODUCTION:

Surgical site infection (SSI) remains a major cause of morbidity after emergency laparotomy, particularly in contaminated (Class III) and dirty (Class IV) wounds. Traditionally, many surgeons leave the skin incision open to reduce infection risk, but this may prolong wound healing, hospital stay and increase health care cost. The role of complete skin closure in these high-risk settings remains controversial. This study aims to compare the skin closure versus open for Class III and Class IV wounds seen in emergency laparotomy.

Methodology

We performed a meta-analysis of prospective and retrospective comparative studies across Cochrane, Medline, Embase and PubMed. Data was synthesized using Review Manager 5.4.1. Primary outcomes included superficial SSI, deep SSI, organ/space SSI, and hospital length of stay. Pooled odds ratios (OR) and mean differences (MD) were calculated with 95% confidence intervals (CI).

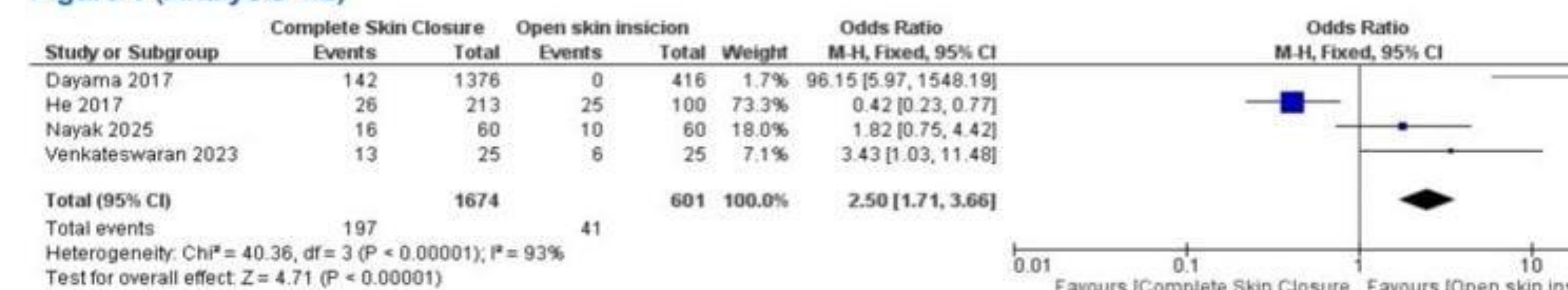
Results

Complete skin closure was associated with significantly higher risk of superficial SSI (RR = 2.50; 95% CI: 1.71-3.66). No significant difference was observed in organ/space SSI (OR = 0.78; 95% CI: 0.58–1.06) and deep SSI (OR = 1.3; 95% CI: 0.80–2.91). Complete skin closure was associated with a shorter hospital stay (MD = -2.49 days; 95% CI: (-3.04 to -1.94, $p < 0.001$).

Conclusion

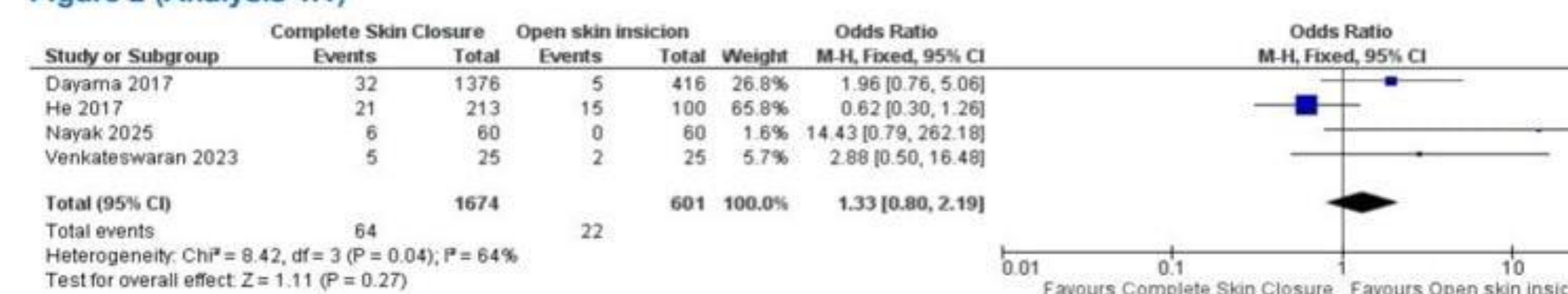
Complete skin closure following emergency laparotomy for contaminated and dirty wounds (class III and class IV) is associated with higher superficial SSI without statistically significant difference in organ/space SSI and deep SSI. However, complete skin closure may contribute to a shorter hospital stay thereby reducing health care cost and burden. These findings highlight the need for risk categorization and decision-making algorithm for leaving skin open versus closed. However larger multicenter randomized control trials and subgroup analysis of existing studies may provide guidance for objective decision making.

Figure 1 (Analysis 1.2)



Forest plot of comparison: 1 Outcomes, outcome: 1.2 Superficial surgical infection (SSI).

Figure 2 (Analysis 1.1)



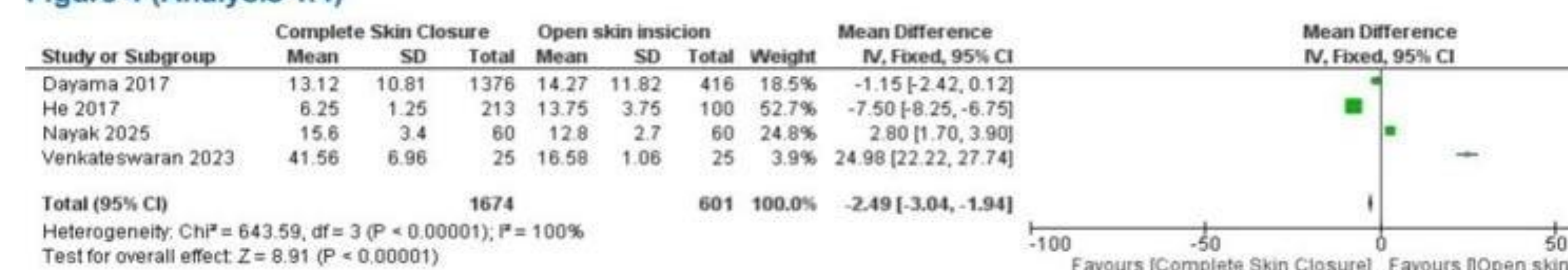
Forest plot of comparison: 1 Outcomes, outcome: 1.1 Deep SSI.

Figure 3 (Analysis 1.3)



Forest plot of comparison: 1 Outcomes, outcome: 1.3 Organ/Space SSI.

Figure 4 (Analysis 1.4)



Forest plot of comparison: 1 Outcomes, outcome: 1.4 Hospital Length of Stay.