



6th WSES Congress 2019

Title: Adhesion-related hospital readmissions in patients with open or laparoscopic abdominal surgery: a nationwide cohort study (SCAR update)

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Topic: Abdominal emergency surgery

Background: In 1999 Ellis published the original SCAR study, the first large epidemiological study to estimate morbidity of adhesions by assessing hospital readmissions. Over 1 in 3 patients who are operated in the abdominal or pelvic cavity were readmitted a mean of 2.1 times during the 10-year follow-up for a potentially adhesion related cause. In the past few decades multiple strategies have been developed to reduce adhesion formation. One the most promising strategies is minimally invasive surgery, which has been adopted in many types of procedures. Population effects of minimally invasive surgery on adhesion related readmission remains unknown.

Aim: This study aims to assess adhesion related readmissions in the present era of laparoscopic surgery.

Methods: Validated population data from the Scottish National Health Service were used to identify a cohort of patients who underwent open or laparoscopic surgery on the abdominal or pelvic cavity between December 2008 and June 2011, without a history of previous abdominal or pelvic surgery. Adhesion related readmissions were reviewed until December 2017, and subdivided by the degree of certainty of adhesion relation (directly related, possibly related, reoperations potentially complicated by adhesions). The primary outcome measure was incidence of adhesion related readmissions.

Results: A total of 72 270 patients were included in the analysis, 29.8% underwent initial laparoscopic surgery. Laparoscopic surgery was associated with a decrease in adhesion related readmissions for all 3 categories (table 1). Patients with initial laparoscopic surgery had less directly adhesion related readmissions 5 years after surgery, compared to the open cohort, 1.7% vs 4.3% respectively (figure 1). Laparoscopic approach to the abdominal cavity reduced adhesion related readmissions in multivariable analysis (HR 0.68, 95% CI 0.60 - 0.77).

Discussion: Laparoscopic surgery reduces the incidence of adhesion related readmissions. Nevertheless, the burden of readmission related to adhesions remains high even in laparoscopic surgery. Despite the rise in laparoscopic surgery, the overall rate of adhesion related readmissions in recent years did not drop drastically compared to rates found in the original SCAR studies.



Table 1, 5 year readmission rates

	Open (N = 50751)	Laparoscopic (N = 21519)
Directly related to adhesions	4.3%	1.7%
Possibly related to adhesions	15.4%	15.0%
Reoperations potentially complicated by adhesions	15.0%	8.6%
Total	28.7%	21.9%

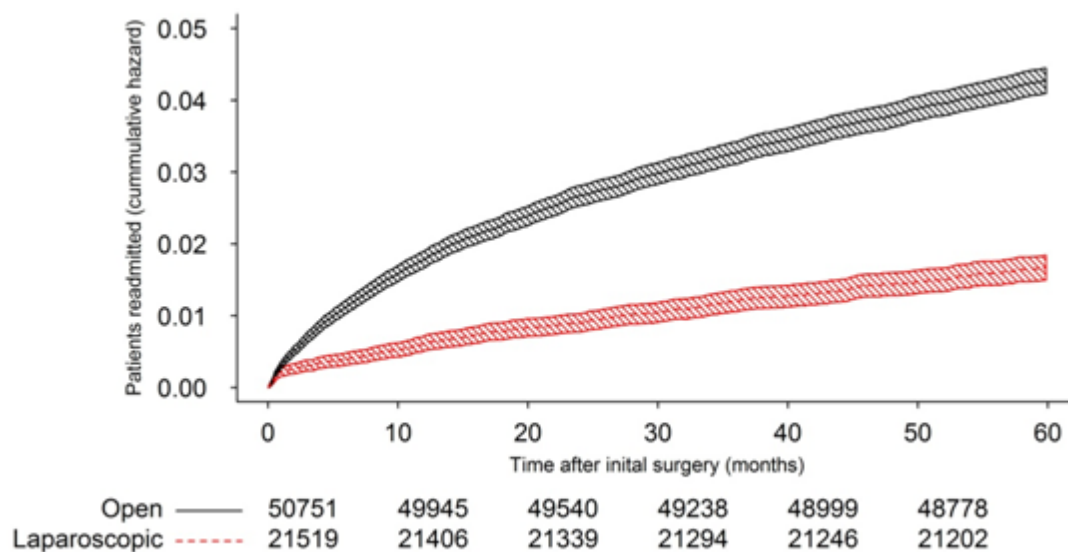


Figure 1, Cumulative readmission rates for directly adhesion related readmissions