Diastasis recti is associated with incisional hernia after midline abdominal surgery

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Background: Incisional hernia (IH) occurs in up to 20% of patients after abdominal surgery and is most common after vertical midline incisions. Diastasis recti (DR), an anatomic separation of the rectus abdominis muscles, may contribute to IH but has not been explored as a risk factor or included in existing hernia risk models. We hypothesized that DR is associated with IH after midline incisions.

Methods: In this single-center study, all patients undergoing elective gastrointestinal surgery with a midline open incision or specimen extraction site captured in a prospective surgical quality collaborative database between 2016-2020 were included. Eligible patients had axial imaging within six months prior to surgery and no less than six months after surgery to determine the presence of DR and IH, respectively. Radiographic hernia-free survival was assessed with log-rank tests and multivariable Cox regression, comparing patients with and without diastasis width >25 mm.

Results: Of 156 patients, forty-four (28.2%) developed radiographic hernia >1 cm. 36 of 85 patients (42.4%) with DR width >25 mm developed IH, compared with 9 of 71 (12.7%) without DR (p<0.001). Hernia-free survival differed by DR width on log-rank testing (p<0.001) and multivariable Cox regression (p<0.001) after adjusting for other significant risk factors: obesity, coronary disease, and high wound classification. The adjusted hazard ratio for DR >25 mm was 3.87 with 95% CI: 1.84 – 8.14 and c-statistic for overall model fit was 0.754. Kaplan-Meier survival curves are shown in Figure 1 and stepwise Cox regression modeling is shown in Table 1.

Conclusion: DR is a significant risk factor for IH after midline abdominal surgery. As a single predictor of IH risk, DR outperformed all other known risk factors and was independently associated with IH in a multivariable model. When present, surgeons can include DR when discussing an individual's surgical risks and should consider a lower-risk, off-midline approach when feasible.

Figure 1. Radiographic hernia-free survival curves with 95% CI's for patients with and without DR >25 mm
Table 1. Results of backward stepwise multivariable Cox regression for incisional hernia
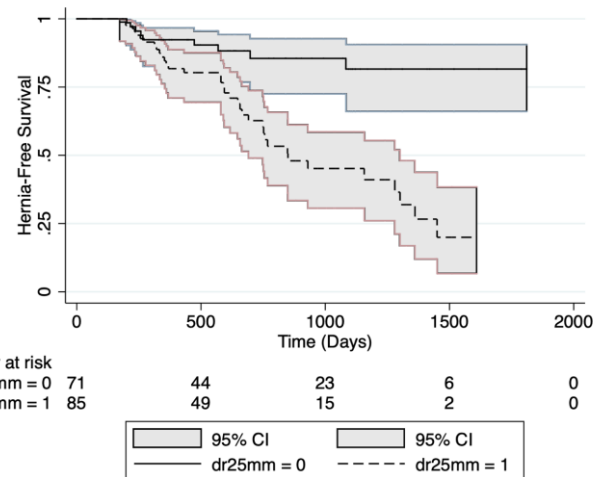
Covariate	Hazard Ratio (95% CI)	Hazard Ratio (95% CI)	**Hazard Ratio (95% CI)**	p-value (Final Model)
Diastasis Recti Width >25 mm	3.13 (1.45 – 6.77)	3.33 (1.55 – 7.18)	**3.87 (1.84 – 8.14)**	<0.001
Coronary Artery Disease (CAD)	2.31 (1.01 – 5.27)	2.50 (1.11 – 5.61)	**2.49 (1.10 – 5.62)**	0.029
Wound Classification III/IV	1.94 (0.95 – 3.97)	1.76 (0.87 – 3.54)	**1.88 (0.94 – 3.76)**	0.072
Body Mass Index >30 kg/m^2	1.78 (0.94 – 3.38)	1.73 (0.91 – 3.27)	**1.80 (0.95 – 3.41)**	0.071
Preoperative Hernia <1 cm	1.76 (0.88 – 3.50)	1.58 (0.82 – 3.07)		
Surgical Site Infection (SSI)	2.14 (0.85 – 5.40)			

Bold typeface represents covariates and hazard ratios (with 95% confidence intervals) for the final model. Covariates were eliminated in stepwise fashion for p>0.1. AUC (c-statistic) for final model fit was 0.754.