Creation of an Accurate Artificial Neural Network Prediction Model of Radiologist Reported CT Features for Colorectal Anastomotic Leaks

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Abstract

Objective: As colorectal anastomotic leaks (AL) often present with non-specific clinical features, Computed Tomography (CT) scans are commonly used to aid in diagnosis. Aim was to define radiologist reported features in CT scans following colorectal resection as diagnostic factors for clinical AL detection.

Methods: Consecutive patients identified with a clinically confirmed post-operative AL. Control group (matched rioe A AL.

Results: 18 patients with confirmed AL, 36 matched control patients. No significant difference in the sensitivity/ specificity between the radiologists in accuracy of leak detection, with overall correct diagnosis of clinical AL 81.4%. Radiological Leak, abnormal bowel wall appearance and ileus were significant predictors ($P<0.05$) within regression model. The prediction model produced an overall sensitivity 85.2%, specificity 80.2% and ROC curve area of 87.3%.

Conclusion: Individual radiologist reported CT features have been used to create a risk prediction model that improves diagnostic accuracy of AL over general radiological impression alone.

Keywords:

Introduction

Ethics

Results

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experience. ANZ J Surg 71: 516-520.

4. McNair AG, Whistance RN, Forsythe RO, Macefeld R, Rees J, et al. (2016) Core outcomes for colorectal cancer surgery: a consensus study. Plos Med 13: e1002071.

5. Buchs NC, Gervaz P, Secic M, Bucher P, Mugnier-Konrad B, et al. (2008) Incidence, consequences, and risk factors for anastomotic dehiscence after colorectal surgery: A prospective monocentric study. Int J Colorectal Dis 23: 265-270.

6. Snijders HS, Wouters MWJM, Van Leersum NJ, Kolfschoten NE, Henneman D, et al. (2012) Meta-analysis of the risk for anastomotic leakage, the postoperative mortality caused by leakage in relation to the overall postoperative mortality. Eur J Surg Oncol 38: 1013-1019.

7. Krarup PM, Nordholm-Carstensen A, Jorgensen LN, Harling H (2014) Anastomotic leak increases distant recurrence and long-term mortality after