



Can the cross-sectional area of the psoas muscle be a predictor of anastomotic failure in male rectal cancer patients?

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See Articles on Page 353-361

Anastomotic leakage (AL) is the most serious postoperative adverse event in rectal cancer surgery. A previous meta-analysis showed that several factors, including male sex, high body mass index, very large tumor size, preoperative chemotherapy, longer operative time, 3 or more stapler firings, a high volume of estimated blood loss, and a lower anastomosis level, were associated with an increased risk of AL [1]. In recent years, sarcopenia, which is defined as the loss of skeletal muscle mass and strength, has been extensively studied in the literature. The cross-sectional area of the psoas muscle provides an estimation of overall muscle mass and has often been used as a surrogate for sarcopenia in clinical research [2]. Several studies have reported associations between sarcopenia and poor postoperative outcomes after the resection of various types of malignancies [3].

Although many studies have been conducted on the relationship between sarcopenia and postoperative complications, including AL, after surgery for colorectal cancer, this issue remains a matter of debate [4-6]. Nakanishi et al. [4] reported that sarcopenia was associated with a higher incidence of overall postoperative complications in colorectal cancer surgery, especially for patients with Clavien-Dindo classification grade of ≥ 2 , whereas it was not correlated with intraabdominal abscesses or AL. However, some studies showed that AL occurred more often in colorectal cancer

patients with low psoas muscle density than in those with high psoas muscle density [5, 6]. A recent meta-analysis, which included 5 prospective studies and 7 retrospective studies with a total of 5,337 colorectal cancer patients, revealed that sarcopenia was associated with a higher incidence of overall postoperative morbidity (odds ratio [OR], 1.70; 95% confidence interval [CI], 1.07–2.70; $P < 0.01$), mortality (OR, 3.45; 95% CI, 1.69–7.02; $P < 0.01$), and infection (OR, 2.21; 95% CI, 1.50–3.25; $P < 0.01$), but not AL or intestinal obstruction [7]. These inconsistent results are probably due to the heterogeneity of the enrolled patients and the lack of a clear and uniform definition of sarcopenia.

Mizuuchi et al. [8] focused on the relationship between sarcopenia and AL in only male rectal cancer patients, who may be a higher-risk group for AL than female patients. Interestingly, their study showed that male rectal cancer patients with a large psoas muscle mass who underwent lower anastomosis had more occurrences of postoperative AL than those with smaller psoas muscle, unlike previous studies. In their study, 197 male rectal cancer patients without a diverting stoma were enrolled, and AL occurred in 45 patients (22.8%). A receiver operating characteristic curve was used to determine the optimal cutoff value of the psoas muscle index for predicting AL as $812.67 \text{ cm}^2/\text{m}^2$ (sensitivity, 60%; specificity, 74.3%). Multivariate analysis revealed that a high psoas muscle index (risk ratio [RR], 3.933; 95% CI, 1.917–8.070; $P < 0.001$) and lower anastomosis (RR, 2.792; 95% CI, 1.221–6.384; $P = 0.015$) were independent predictors of AL. The authors' interpretations of these results were as follows: (1) a large psoas muscle can cause the pelvic cavity to be severely narrow due to the reduced anatomical space that is usually already narrow in men, and surgical procedures in the pelvis are extremely difficult; and (2) a large psoas muscle mass increases the physical force at the anastomotic site, which can influence AL. Although the present study was subject to selection bias and confounding factors because of its omission of patients who received a diverting stoma or underwent preoperative chemoradiotherapy, as well as its single-center retrospective design, it is meaningful that this is the first study to investigate the relationship between sarcopenia and

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anastomotic failure in a highly selective group. Therefore, further well-designed prospective studies are needed to corroborate these results.

CONFLICT OF INTEREST

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REFERENCES

1. Qu H, Liu Y, Bi DS. Clinical risk factors for anastomotic leakage after laparoscopic anterior resection for rectal cancer: a systematic review and meta-analysis. *Surg Endosc* 2015;29:3608-17.
2. Morrell GR, Ikizler TA, Chen X, Heilbrun ME, Wei G, Boucher R, et al. Psoas muscle cross-sectional area as a measure of whole-body lean muscle mass in maintenance hemodialysis patients. *J Ren Nutr* 2016;26:258-64.
3. Joglekar S, Nau PN, Mezhir JJ. The impact of sarcopenia on survival and complications in surgical oncology: a review of the current literature. *J Surg Oncol* 2015;112:503-9.
4. Nakanishi R, Oki E, Sasaki S, Hirose K, Jogo T, Edahiro K, et al. Sarcopenia is an independent predictor of complications after colorectal cancer surgery. *Surg Today* 2018;48:151-7.
5. Herrod PJJ, Boyd-Carson H, Doleman B, Trotter J, Schlichtemeier S, Sathanapally G, et al. Quick and simple; psoas density measurement is an independent predictor of anastomotic leak and other complications after colorectal resection. *Tech Coloproctol* 2019;23:129-34.
6. Margadant CC, Bruns ER, Sloothaak DA, van Duijvendijk P, van Raamt AF, van der Zaag HJ, et al. Lower muscle density is associated with major postoperative complications in older patients after surgery for colorectal cancer. *Eur J Surg Oncol* 2016;42:1654-9.
7. Sun G, Li Y, Peng Y, Lu D, Zhang F, Cui X, et al. Can sarcopenia be a predictor of prognosis for patients with non-metastatic colorectal cancer? A systematic review and meta-analysis. *Int J Colorectal Dis* 2018;33:1419-27.
8. Mizuuchi Y, Tanabe Y, Sada M, Tamura K, Nagayoshi K, Nagai S, et al. Cross-sectional area of psoas muscle as a predictive marker of anastomotic failure in male rectal cancer patients: Japanese single institutional retrospective observational study. *Ann Coloproctol* 2022;38:353-61.