

直线切割闭合器在胰体尾切除术中的应用与进展

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摘要: 胰体尾切除术是治疗胰体尾良、恶性肿瘤、慢性胰腺炎等疾病的主要治疗方式。胰漏为胰体尾切除术后最常见且最具潜在危害性的并发症之一, 是胰腺外科医生面临的重要课题。直线切割闭合器具有操作简易、有效封闭胰腺断端等特点, 广泛的应用于胰体尾切除术中。本文简要回顾了胰体尾切除术后胰瘘的危险因素, 胰腺断端处理方式, 直线切割闭合器在胰体尾切除术中的应用与技巧改进, 并进一步展望直线切割闭合器的发展趋势。

关键词: 直线切割闭合器, 胰瘘, 胰体尾切除术

Application and progress of stapler closure of pancreatic stump in distal pancreatectomy

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Abstract: Distal pancreatectomy is the main treatment for benign or malignant tumors, chronic pancreatitis, and other diseases located in pancreatic body and tail. Postoperative pancreatic fistula is one of the most common and potentially harmful complications after distal pancreatectomy, posing a significant challenge for pancreatic surgeons. The stapler closure of the pancreatic stump is technically easy and effective, and it is widely employed in distal pancreatectomy. This article briefly summarizes the risk factors for pancreatic fistula after distal pancreatectomy, the techniques of pancreatic stump closure, the application and progress of linear stapler closure of pancreatic stump in distal pancreatectomy, and further predict the development trend of linear stapler.

Keywords: linear stapler, pancreatic fistula, distal pancreatectomy

1. 术后胰瘘--胰腺手术的阿喀琉斯之踵

胰体尾切除术是治疗胰体尾部良、恶性肿瘤、慢性胰腺炎等疾病的主要治疗方式。随着外科理念的更新、手术技术的发展及围手术期治疗水平的提高, 胰体尾切除术的并发症及围手术期死亡率不断下降⁽¹⁾。然而, 胰漏作为胰体尾切除术最常见且最具潜在危害性的并发症之一, 发生率仍高达30%至50%。特别是临床相关性胰瘘 (clinically relevant postoperative pancreatic fistula, CR-POPF) 发生率约为13%至27%, 被喻为胰腺手术的“阿喀琉斯之踵”⁽²⁻⁵⁾。如何有效防治CR-POPF是胰腺外科医生面临的重要课题。

胰体尾切除术后胰瘘发生的危险因素主要包括3个方面: 患者因素 (如年龄、性别、体重指数、营养状态等)、胰腺因素 (如胰腺质地、主胰管直径、病理类型

等) 和手术因素 (如手术时间、术中失血、胰腺残端处理等)⁽⁶⁻¹⁰⁾。除了围手术期管理外, 胰腺残端处理是我们可以控制的重要因素之一。然而, 目前尚无一种被广泛认同的胰腺断端处理方式。胰腺断端处理方式包括经典的手工缝合、直线切割闭合器闭合、主胰管缝扎、胰肠吻合、自体组织包裹、生物胶或网状补片加固、胰肠吻合和胰胃吻合等⁽¹⁰⁻¹⁸⁾。

2. 直线切割闭合器在胰体尾切除术中的应用

理想的胰腺断端处理应该是既操作简易、方便, 又能有效的封闭胰腺断端, 减少出血及胰瘘的发生, 进而降低术后并发症, 减少术后住院时间, 减轻患者痛苦。直线切割闭合器作为一种外科手术器械, 广泛应用于胃肠手术、肺部手术、肝脏手术及胰腺手术等多种外科手术中。其将组织切开并同时缝合, 缩短了手术时间且降低了手术难度, 是理想的胰腺断端处理方式之一。

一项前瞻性多中心随机对照研究 (DISPACT研究) 纳入欧洲21个中心450例接受胰体尾切除术的病人, 研究显示直线切割闭合器组的CR-POPF发生率为32%, 手工缝合组为28%, 差异无统计学意义 ($P=0.56$, $OR=0.84$, 95%

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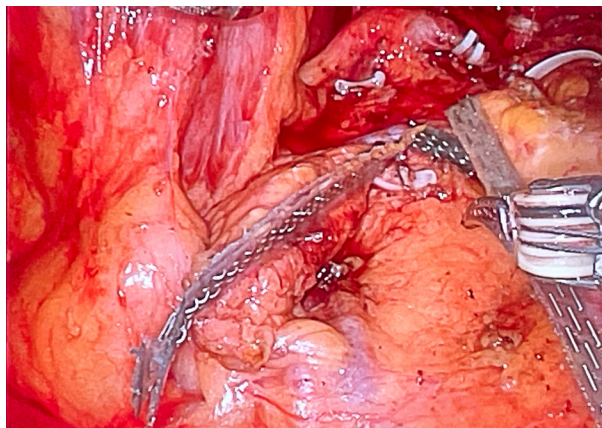


图1. Signia™ Stapling System离断胰腺后创面。

CI: 0.53–1.33)⁽¹¹⁾。多项研究亦证实直线切割闭合器在预防胰瘘发生方面不劣于手工缝合^(19,20)。特别是腹腔镜胰体尾切除术的普及，直线切割闭合器在胰体尾切除术中的应用越来越普遍。

3. 直线切割闭合器应用技巧

为了更好的成钉，直线切割闭合器钉仓要根据胰腺厚度、质地及水肿情况个体化选择，不同器械公司一般配有多种型号钉仓以供个体化选择。然而，胰腺被膜撕裂、胰腺断端出血、CR-POPF仍无法完全避免。

因此，有部分学者建议在使用直线切割闭合器时，除了选择合适的钉仓，还应缓慢闭合钳口、维持压榨及延长激发后压榨时间，以降低胰腺组织切割和撕裂风险⁽²¹⁻²⁴⁾。Ipei Matsumoto⁽²²⁾及Masafumi Nakamura⁽²³⁾提出直线切割闭合器的钳口应缓慢闭合，时长约1–3分钟，然后再压榨3分钟，激发后仍保持压榨状态至少1–2分钟；Keiichi Okano⁽²⁴⁾提出直线切割闭合器的钳口应缓慢闭合，时长超过5分钟，激发后保持压榨状态至少2分钟。

此外，也有学者建议术中若发现胰腺断端有明显的主胰管，予主胰管位置缝扎加固，或者常规行胰腺断端加固缝合，以期能降低CR-POPF风险^(21,25,26)。

4. 直线切割闭合器的自动化和智能化

笔者在东京大学附属病院学习期间，发现Signia™ Stapling System（柯惠医疗，日本东京）在肝胆胰外科应用频繁。该直线切割闭合器结合了自动化与传统手术器械的优点，能够根据组织的厚度和硬度产生的阻力值自动调节闭合器击发速度，还能在压榨组织时反馈组织与钉仓的适配程度，通过手柄顶部的显示和声音反馈提醒外科医生使用更合适的钉仓，从而降低胰腺组织被压榨撕裂的风险，有效提高直线切割闭合器的精准度及安全性。同时，切割闭合器将旋转、弯曲、激发等操作全部电动化，有助于外科医生单手操作。尽管Signia™ Stapling System对胰瘘发生率的影响仍需要进一步的长期临床观察。但是我们从离断后的胰腺断端（图1）来看，胰腺组织如同被熨烫过一样平整，有助于吻合器更好的成钉。

5. 结语

总的来说，直线切割闭合器在胰体尾切除术中已广泛应用。然而，胰瘘作为胰腺手术中的主要并发症，其发生率仍然较高，需要进一步的技术改进和临床研究。未来随着技术的发展，新型的直线切割闭合器将会展现出更先进的自动化和智能化，更好的服务于临床。

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