

Single-incision Sutureless Partial Nephrectomy for Small Exophytic Renal Tumors

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Introduction

Single-Site Sutureless Partial Nephrectomy (SSPN) is a minimally invasive surgical approach that has gained increasing attention in the management of small exophytic renal tumors. These tumors, typically classified as T1a or T1b on the TNM staging system, present a significant clinical challenge as they are often localized to the outer layer of the kidney. The standard treatment for small renal masses has been partial nephrectomy, which involves removing the tumor while preserving as much healthy renal tissue as possible [1]. However, traditional open and laparoscopic techniques for partial nephrectomy often come with various complications, such as increased risk of bleeding, prolonged recovery times and the need for multiple incisions. In response to these issues, single-site sutureless partial nephrectomy offers a promising alternative. This technique is characterized by its use of a single, small incision, which is typically made in the umbilical region and the avoidance of suturing during tumor excision, thereby reducing operating time and potential for postoperative complications. This article will explore the benefits, challenges and evolving techniques surrounding single-site sutureless partial nephrectomy for small exophytic renal tumors, shedding light on its potential to revolutionize the treatment landscape for renal malignancies [2].

Description

Small exophytic renal tumors are primarily identified through imaging techniques such as CT scans, MRI and ultrasound. These tumors, often diagnosed incidentally during imaging for other reasons, are typically small (less than 4 cm in diameter) and grow outward from the renal capsule. Exophytic tumors are considered favorable for surgical intervention because they tend to be well-localized and have less potential for regional spread. Despite their small size, surgical resection remains the gold standard treatment, as complete removal minimizes the risk of progression to more advanced stages or metastasis. Traditional Partial Nephrectomy (PN) involves open or laparoscopic approaches where the surgeon excises the tumor and sutures the renal parenchyma to ensure hemostasis and proper closure. These procedures, however, carry significant drawbacks in terms of recovery time, risk of complications and long-term renal function [3].

Single-Site Sutureless Partial Nephrectomy (SSPN) was introduced as an innovative technique to overcome some of these limitations. SSPN employs a minimally invasive, laparoscopic approach, typically using a single, small incision at the umbilicus, which serves both as an access point for the surgical instruments and for the removal of the tumor. One of the most notable aspects of this approach is the "sutureless" nature of the procedure meaning that once the tumor is excised, there is no need for traditional suturing of the renal parenchyma. Instead, advanced hemostatic agents, like hemostatic sponges or sealants, are used to control bleeding, reducing both the complexity and duration of the surgery. By eliminating sutures, surgeons also avoid the risk of needle-induced renal damage, which can sometimes occur during

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conventional suturing procedures. Furthermore, the single-site approach contributes to less postoperative pain, quicker recovery and a better cosmetic outcome, as it involves only a single, small incision that is often hidden within the umbilical fold [4].

The procedure begins with the patient being placed under general anesthesia and positioned supine on the operating table. A small incision is made at the umbilicus, through which a single-port laparoscopic system is introduced. The abdominal cavity is insufflated to allow sufficient space for the surgical instruments and the operating camera. The surgeon then proceeds with renal exploration using laparoscopic tools, identifying the tumor and ensuring it is exophytic and accessible for resection. Depending on the tumor's size and location, the kidney may be mobilized to achieve better exposure [5].

Conclusion

Single-site sutureless partial nephrectomy represents a significant advancement in the field of renal surgery, offering a minimally invasive, effective and cosmetically favorable solution for patients with small exophytic renal tumors. With its reduced operating time, decreased risk of complications and faster recovery, it has the potential to become a preferred treatment modality for certain patient populations. While the technique is not without its challenges, particularly in terms of patient selection and the technical demands of the procedure, the ongoing refinement of surgical techniques and the increasing availability of robotic assistance promise to address these limitations over time.

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Conflict of Interest

None.

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