

Laparoscopic Simple Nephrectomy - Not Always Simple

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ABSTRACT

Objective: Nephrectomies for atrophic kidneys, especially those complicated by xanthogranulomatous pyelonephritis (XGPN), pose substantial surgical challenges due to severe fibrosis and inflammation affecting the renal hilum and surrounding tissues. This study evaluates the outcomes and complications associated with laparoscopic nephrectomy in such complex cases.

Methods: This retrospective study reviewed 60 cases of laparoscopic nephrectomy for XGPN-affected atrophic kidneys at Civil Hospital Ahmedabad between 2014 and 2024. The study analyzed intraoperative challenges, postoperative outcomes, and complications.

Results: In 5 cases (8.3%), severe inflammation necessitated conversion to open surgery. Histopathology confirmed XGPN in all patients. Complications occurred in 7 patients (11.7%), with no cases of postoperative fistula, abscess, or dialysis requirement.

Conclusions: Laparoscopic nephrectomy remains viable for XGPN-affected atrophic kidneys, though the complexity of the procedure demands thorough preoperative planning and readiness for open conversion.

Keywords: simple, nephrectomy, XGPN, open, surgery, laparoscopic, atrophic, fistula, dialysis, outcome, conversion

INTRODUCTION

Nephrectomy, commonly performed for benign and malignant renal conditions, poses substantial challenges when treating atrophic kidneys affected by xanthogranulomatous pyelonephritis (XGPN) (1). XGPN is a rare, chronic inflammatory condition that often results in the destruction of the renal parenchyma and replacement with granulomatous tissue (2). This condition is characterized by extensive fibrosis, making laparoscopic nephrectomy particularly complex due to adhesions and fibrotic changes involving the renal hilum (3). These adhesions complicate dissection,

increasing the risk of conversion to open surgery (4).

The incidence of XGPN is low, but it presents a surgical challenge because of the potential complications that arise during laparoscopic dissection (5). This study investigates the outcomes of laparoscopic nephrectomy in patients with XGPN-affected atrophic kidneys and explores potential intraoperative and postoperative complications.

MATERIALS & METHODS

Patient Selection

The study retrospectively analyzed 60 patients undergoing laparoscopic nephrectomy for atrophic kidneys complicated by XGPN between 2014 and 2024 at Civil Hospital Ahmedabad. Inclusion criteria included a diagnosis of XGPN based on clinical, radiological, and pathological findings.

Preoperative Evaluation

All patients underwent comprehensive preoperative assessments, including:

Biochemical tests: Serum creatinine, blood urea nitrogen (BUN), and electrolytes to evaluate renal function.

Imaging: CT scans were conducted to assess renal size, the presence of stones, and any fistulas or abscesses. Scintigraphy further confirmed non-functionality of the affected kidney.

Renal function: Scintigraphy provided additional confirmation of kidney function or dysfunction.

Surgical Technique

Procedures were initiated laparoscopically using a transperitoneal approach. Pneumoperitoneum was established, and three to four trocars were inserted under direct vision. Dissection aimed to expose the renal hilum, avoiding damage to adjacent organs, particularly when severe fibrosis complicated access to the hilum. Conversion to open surgery was necessitated in cases where dissection was unsafe or impractical due to adhesions.

Outcome Measures

The study's primary outcomes included the rate of conversion to open surgery, intraoperative complications, and postoperative recovery. Postoperative complications were classified according to the Clavien-Dindo classification system. Secondary outcomes included histopathological findings and postoperative renal function measurement.

RESULT

Table 1: Patient Demographics and Procedure Overview

Parameter	Result
Total Patients	60
Left Nephrectomy	30
Right Nephrectomy	30

Table 2: Intraoperative Findings

Intraoperative Parameter	Result
Severe Inflammation and Fibrosis	Present in all cases
Intraoperative Conversions	5 (8.3%) due to extensive adhesions

Table 3: Postoperative Complications

Complication Parameter	Result
Overall Postoperative Complications	7 (11.7%)
Complication Severity (Clavien-Dindo)	All grade II or lower
Severe Complications	None (fistula, abscess, sepsis)
Dialysis Requirement	None

Table 4: Pathological Findings

Pathological Parameter	Findings
Confirmed Diagnosis	XGPN
Characteristic Features	Granulomatous inflammation, lipid-laden macrophages, extensive fibrosis

Intraoperative Findings

Of the 60 patients, 30 underwent left nephrectomy and 30 underwent right nephrectomy. Severe inflammation and

fibrosis were present in all cases, with conversion to open surgery required in 5 cases (8.3%) due to extensive adhesions

preventing safe dissection of the renal hilum.

Complications

Postoperative complications were observed in 7 patients (11.7%), all of which were Clavien-Dindo grade II or lower (7). No instances of postoperative fistula, abscess formation, or sepsis were recorded. Additionally, none of the patients required dialysis. Pathology confirmed XGPN in all specimens, demonstrating granulomatous inflammation, lipid-laden macrophages, and extensive fibrosis (8)

Pathology Findings

Histopathological examination of all nephrectomy specimens revealed characteristic features of XGPN, including granulomatous inflammation and lipid-laden macrophages, which are consistent with the literature (9).

DISCUSSION

Surgical Challenges

The presence of XGPN in the kidney presents unique surgical challenges, particularly in terms of inflammation and fibrosis around the renal hilum (10). These factors make laparoscopic dissection difficult and increase the likelihood of conversion to open surgery. This study's conversion rate of 8.3% aligns with other reports citing rates of 5-20% for XGPN cases (11).

Postoperative Complications

Despite the complexity of the procedure, the incidence of significant complications was low. Most complications were minor and classified as Clavien-Dindo grade II, with no cases of fistula, abscess formation, or sepsis. This outcome contrasts with some studies suggesting higher complication rates for XGPN nephrectomy, possibly due to variability in case severity and surgical experience (12).

Long-term Outcomes

Laparoscopic nephrectomy in XGPN patients offers benefits over open surgery, such as shorter hospital stays and faster recovery (13). However, the potential need for conversion to open surgery should always be anticipated. Surgeons must be vigilant in preoperative planning and cautious of intraoperative challenges (14).

CONCLUSION

Laparoscopic nephrectomy for atrophic kidneys complicated by XGPN is technically challenging but feasible with adequate preoperative planning and intraoperative flexibility. The procedure offers advantages over open surgery, including quicker recovery times and less postoperative pain. However, surgeons should be prepared for conversion to open surgery and aware of potential complications.

Declaration by Authors

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