LAPAROSCOPIC MANAGEMENT OF RENAL CELL CARCINOMA

Essay

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قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ
الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

سورةالبقرة الآية (٣٢)

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List of Abbreviations

RCC	Renal Cell Carcinoma
mRCC	Metastatic Renal Cell Carcinoma
SMA	Superior Mesenteric Artery
IVC	Inferior Vena Cava
ORN	Open Radical Nephrectomy
OPN	Open Partial Nephrectomy
LRN	Laparoscopic Radical Nephrectomy
LPN	Laparoscopic Partial Nephrectomy
NSS	Nephron Sparing Surgery
OS	Overall Survival
RFS	Recurrence-free Survival Rate
CSS	Cause Specific Survival
LCA	Laparoscopic Cryo Ablation
RFA	Radio Frequency Ablation
LRF	Laparoscopic Radio Frequency Ablation
PFS	Progression-free Survival
WIT	Warm Ischemia Time
LESS	Laparoendoscopic Single Site
NOTES	Natural Orifice Trans-Endoscopic Surgery
SRMs	Small Renal Masses
Vs.	Versus

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INTRODUCTION

Renal cell carcinoma (RCC) has been increasing in theUnited States and Europe by nearly 3–4% per year in recentdecades ***(Hock; et al., 2002).*** In the United States, there were an estimated 51, 190 new cases and 12,890 deaths in 2007. The majority of RCCs are, nowadays, incidentally detected as small renal masses (SRMs) by abdominal imaging in asymptomatic patients ***(Jemal & Siegel, 2010).***

RCCs comprise 85% to 90% of renal parenchymal tumors that are radiologically demonstrated to be solid. Differentiation of renal cysts exhibiting complex features such as thickness, nodularity, calcification of the cyst wall, internal septations, or heterogeneity is mandatory, and a systematic assessment using these objective criteria facilitates the estimation of the risk of malignancy ***(Bosniak, 1986).***

The therapeutic approach to renal cell carcinoma (RCC) is guided by the probability of cure, which is related directly to the stage or degree of tumor dissemination ***(Jonasch et al., 2006).***

The treatment options for renal cell cancer are surgery, radiation therapy, chemotherapy, hormonal therapy, immunotherapy, or combinations of these. Selected patients with metastatic disease respond to immunotherapy, but many patients with advanced disease can be offered only palliative therapy ***(Linehan et al., 2001).***

Surgical resection remains the only known effective treatment for localized renal cell carcinoma, and it also is used for palliation in metastatic disease. About 25-30% of patients have metastatic disease at diagnosis, and fewer than 5% have solitary metastasis. Surgical resection is recommended in selected patients with metastatic renal carcinoma. This procedure may not be curative in all patients but may produce some long-term survivors. The possibility of disease-free survival increases after resection of primary tumor and isolated metastasis excision ***(Simon et al., 2000).***

Metastasectomy of a solitary metastasis is recommended in selected patients with good performance status. A large retrospective analysis from a single institution revealed improved cancer-specific survival advantage, even with metastasectomy of more than one lesion. The study also revealed increased risk of death due to renal cell carcinoma in patients who did not undergo surgical resection of metastasis ***(Boorjian et al., 2011).***

Laparoscopic radical nephrectomy has emerged as a standard surgical option for the treatment of renal cell carcinoma, First described by Clayman in 1991 ***(Clayman et al., 1991).***

Laparoscopic radical nephrectomy is associated with reduced postoperative pain and improved convalescence versus open radical nephrectomy ***(Lam et al., 2004).***

Furthermore, long-term studies have demonstrated similar oncologic outcomes with standard open radical nephrectomy ***(Chan et al., 2001).***

As specified in the 2007 European Association of Urology (EAU) recommendations, nephron-sparing surgery (NSS) is an established curative approach for the treatment of RCC in selected SRMs. NSS for tumours>4–7 cm maximum diameter (T1b tumours) can be performed in centres with expertise in selected patients, and open partial nephrectomy (OPN) currently remains the standard of care, as it yields the same oncologic outcomes as radical nephrectomy (RN) but preserves better renal function and quality of life (QoL) ***(Chan et al., 2001).***

In the past, radical nephrectomy (RN), or removal of the entire kidney, was considered the standard therapy. However, partial nephrectomy (PN) is quickly becoming the standard care in the United States for renal cortical tumors smaller than 4 cm in diameter.Partial nephrectomy refers to when a surgeon removes the diseased tissue from the kidney. Partial nephrectomy can be accomplished laparoscopically through small incisions ***(Ljungberg et al., 2007).***

Laparoscopic partial nephrectomy (LPN) was introduced several years ago by Winfield ***(Winfield et al., 1993).*** This method is much preferable to open nephrectomy surgeries, where the surgeon must create a large incision and open the

body cavity. Laparoscopic surgery results in less postoperative pain, a shorter hospitalization stay, and a quicker recovery ***(Stryker et al., 2011).***

A study by Zagoria et al found that radiofrequency ablation can result in durable oncological control in patients with renal cell carcinomas that are smaller than 4 cm who are poor surgical candidates ***(Zagoria et al., 2011).***

AIM OF THIS WORK

- To provide data about the success rate of laparoscopic intervention in renal cell carcinoma cases (without open conversion).
- To provide a comparative data between open and laparoscopic techniques.
- To Provide a comparative data between techniques of laparoscopic intervention (Transperitoneal, Retroperitoneal and Hand- assisted).

ANATOMY OF THE KIDNEY

Gross Features

Kidneys are paired retroperitoneal organs situated in posterior part of the abdomen on each side of the vertebral column. The upper pole of each kidney lies opposite the twelfth thoracic vertebra, and the lower pole lies opposite the third lumbar vertebra. The right kidney is usually slightly more caudal in position. The weight of each kidney ranges from 125g to 170 g in the adult male and from 115 g to 155 g in the adult female. The kidney is approximately 11 cm to 12 cm in length, 5.0 cm to 7.5 cm in width, and 2.5 cm to 3.0 cm in thickness. Located on the medial or concave surface of each kidney is a slit, called the renal hilum, through which the renal pelvis, the renal artery and vein, the lymphatics, and a nerve plexus pass into the sinus of the kidney. The organ is surrounded by a tough fibrous capsule, which is smooth and easily removable under normal conditions. The surgical anatomy of the left and right side kidneys extensively differs, with the fundamental change being the location of the left and right kidneys relative to neighboring organs and primary blood vessels ***(Chung et al., 2003)***

Left Kidney

The left kidney is slightly higher in position than the right one. The spleen and tail of the pancreas usually cover the top half of the anterior left kidney, and the lower half of the