RENAL CELL CARCINOMA
- Surgical considerations

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Introduction

• RCC accounts for 3% of all adult malignancies
• Incidence of RCC diagnosis has increased 2.3%-4.3% per year since 1970s due to widespread US and CT scanning for evaluation of unrelated abdominal complaints.

(Chow et al, JAMA 1999)
Incidental renal masses


• 2/3 of renal cancers are detected incidentally (Homna. Y, Int J Urol, 1995)

• Usually small (< 4 cm), Lower grades (Grade I-II) Metastasis less common (10% vs 20%) (Luciani, Urology 2000)

• In 2008, 70% of the 54 000 new cases - small (<4cm) asymptomatic. Of this 10-20% high risk. (Gill 2009)
Renal mass

• Criteria to define mass:
  - Attenuation value and if increased with contrast
    – Demarcation of mass with normal parenchyma
    – Thickness of wall of mass

• Not all enhancing small renal masses (< 3 cm) represent RCC.

• Need to rule out lymphoma, angiomyolipoma, pseudotumour and metastatic disease
Watchful waiting – Arguments for

- Slow growth of many of these small tumours (Bosniak, Radiology 1995)
- Tumour < 3 cm low risk of metastasis (Bosniak 1991, 1995)
- Greatest incidence of incidental renal masses occurs in patients 70 – 90 years old (Chow et al., JAMA, 1999)
- Multiple co-morbidities create therapeutic dilemmas.
- These small tumours can be followed up 6 monthly to yearly
Watchful waiting
(Michael J et al, Urology, July 2004)

- 29 consecutive patients with contrast enhancing renal mass < 3.5 cm managed conservatively with follow up CT scans at 6 months.
- Average age was 70.5 years
- Average diameter of renal mass was 1.83 cm
- Average duration of follow up - 32 mths
Watchful waiting
(Michael J et al, Urology, July 2004)

- Of the 29, 15 had renal masses with no growth during follow up. 3 of the 15 patients had nephrectomy due to pts wish, 2 of the 3 had RCC.
- 4 patients underwent nephrectomy (3 due to patient wish and 1 due to tumour growth)
- 2 others underwent radiofrequency ablation (patients wish)
- 3 patients terminated F/up
- Not easy to do
Conclusion

- 85% of small contrast enhancing renal masses < 3.5 cm contained RCC
- These masses have a slow growth rate
- Patients unfit for intervention with such masses can be treated conservatively but with followup CT scan at 6 months after the first diagnosis.
Arguments against Watchful waiting

Better outcome in smaller tumours
- 5 year survival RCC (< 4 cm) 97% with radical surgery and 100% in nephron sparing surgery (Butler et al, Urology 1995)
- T1 tumour subdivided to T1a (4cm) and T1b (> 4 cm- 7 cm) for better prognostication (UICC 2002)

No effective treatment for metastatic RCC

Availability of minimally invasive treatments like radiofrequency ablation and cryotherapy

Option of nephron sparing surgery
Role of Percutaneous Renal Biopsy
Needle biopsy

- Prospective analysis of needle biopsy of solid renal mass (Dechet, J Uro 1999)
  - 106 patients using 18 G biopsy gun
  - 2 independent pathologist
  - Sensitivity- 77-84%
  - Specificity- 60-73%
  - PPV- 94-96% / NPV- 69-73%
  - Large degree of inaccuracy in benign lesions, not recommended in decision making.
Percutaneous biopsy

• Current indication
  – Metastasis to kidney
  – Lymphoma
    • 50 cases, 80% presented with ARF and renal biopsy and diagnosed with B cell lymphoma
      (Tom Tomroth, Am J Kidney Ds, 2003)

• Needle tract seeding – very small risk
  (Goethuys, Eur Uro, 1996)
Surgical Options for Localised Renal Cell Carcinoma

Established
• Open Radical Nephrectomy
• Lap Radical Nephrectomy
• Open Partial Nephrectomy
• Lap Partial Nephrectomy

Emerging
• Cryotherapy
• Radiofrequency ablation

Experimental
• HIFU
Open Radical Nephrectomy

- Established method of treatment (Robson 1969 – 66% and 64% overall survival for stage I and II tumours.
- Still remains the overall goal standard
- Various approaches depending on tumour location, size and body habitus
- Suitable for all tumour sizes
- Only approach feasible if have IVC thrombus
- The concept of radical nephrectomy encompasses the basic principles of early ligation of the renal artery and vein, removal of the kidney outside Gerota's fascia, removal of the ipsilateral adrenal gland, and performance of a complete regional lymphadenectomy from the crus of the diaphragm to the aortic bifurcation. (Robson)
- Controversy has arisen concerning the need for some of these practices in all patients
Issues regarding Open Radical Nephrectomy

- Routine removal of perinephric fat – accepted due to 25% of localised tumours having perinephric fat involvement.
- Preliminary vascular (arterial) control – acceptable but may be difficult to perform in large tumours
- Routine removal of ipsilateral adrenal gland not recommended unless there is radiographic eg CT scan evidence of adrenal enlargement or direct invasion, upper pole renal tumours or large renal tumours (involving most of the kidney).


Lymphadenectomy during Open Radical Nephrectomy

• Performance of a complete regional lymphadenectomy in radical nephrectomy remains controversial.

• Regional lymph node extension is an important prognostic factor usually associated with poor survival.

• Although performance of a complete regional lymphadenectomy allows more accurate staging of the extent of RCC, the therapeutic value of this information is limited because there is no effective systemic treatment for patients with advanced disease.
Lymphadenectomy during Open Radical Nephrectomy

- Therapeutic role for lymphadenectomy is questionable.
  - Most patients with positive lymph nodes have bloodborne metastases.
  - The lymphatic drainage of the kidney is variable, extensive retroperitoneal dissection cannot reasonably remove all possible sites of metastasis.
  - Many patients without metastases to regional lymph nodes develop disseminated metastases.

- Most Urologists would perform a limited lymph node dissection with radical nephrectomy, incorporating the renal hilar and immediately adjacent paracaval or para-aortic lymph nodes.
Laparoscopic Radical Nephrectomy
Laparoscopic Radical Nephrectomy – Historical perspective

• First reported series by Kavoussi et al in 1993 but did not really took off until late 1990s
• Early concerns about adequacy of oncological control and long term data not available
• Concern about use of morcellator in view of inability to obtain proper pathological staging which has bearing on outcome
• Early few reports about port site metastasis related to improper usage of morcellator
• Caddedu et al, 1998 reported a 91% 5-year actuarial disease-free rates for all patients in a multi-institutional study of 157 patients undergoing laparoscopic radical nephrectomy for clinical stage I (T1–T2) RCC
Laparoscopic Radical Nephrectomy – Current Status

- Emerging as the treatment of choice for T1 tumours (<8cm) (EAU guidelines)
- Also for selected T2 and T3a tumours with no local invasion or extensive lymphadenopathy
- Isolated reports of T3b tumours treated (Desai MM, Gill IS et al JUrol 2003; 169(2):487-91)
- Not recommended for cases of tumours with IVC thrombus
- Laparoscopic cytoreductive nephrectomy for metastatic RCC as prelude to immunotherapy. (Walther et al Urology 1999;53(3):496-501 - reduced time by one month)
Laparoscopic Radical Nephrectomy – Current Status

- Options of transperitoneal, retroperitoneal or hand assisted

- Most centres remove specimens intact via a short lower abdominal incision

- Comparable oncological outcomes with open radical nephrectomy and comparable complication rates

- Obvious benefits in early recovery, ambulation, less analgesia requirement and early return to normal activity
Best approach for LRN?

- Majority performed via transperitoneal approach.
- Familiarity with the transperitoneal route with more recognizable landmarks
- No prospective randomised trial comparing transperitoneal versus retroperitoneal approaches.
- Hand assisted approach can be applied to both transperitoneal and retroperitoneal route
Hand Assisted LRN

Advantages:
- Shorter learning curve
- Use of hand in dissection and tactile feedback available
- Hand port size is similar in length to wound made for extraction of intact specimen in pure lap approach
- Less likely to convert in case of bleeding

Disadvantages:
- Added Cost of Hand port device
- Limited working space
### Hand laparoscopic nephrectomy: comparison to standard laparoscopic nephrectomy

Wolf JS, Moon TD, Nakada SY. *J Urol* 1998;160:22-27

<table>
<thead>
<tr>
<th></th>
<th>Hand assisted</th>
<th>Standard Lap</th>
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<tbody>
<tr>
<td><strong>No of cases</strong></td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td><strong>Mean Op Time</strong></td>
<td>4 hours</td>
<td>5.4 hours</td>
</tr>
<tr>
<td><strong>Estimated blood loss</strong></td>
<td>211 ml</td>
<td>340 ml</td>
</tr>
<tr>
<td><strong>Hospital Stay</strong></td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td><strong>Analgesic requirement</strong></td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td><strong>Major complications</strong></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Return to normal activity</strong></td>
<td>14 days</td>
<td>10 days</td>
</tr>
</tbody>
</table>
Nephron Sparing Surgery
History

• 1st partial nephrectomy in 1884 by Wells for the removal of a perirenal fibrolipoma.

• 1st Partial nephrectomy to treat renal malignancy (1890) by Czerny.

• In 1950, Vermooten reported that peripherally located, encapsulated renal tumors could be removed by partial excision of renal tissue.

• In 1990, laparoscopic nephrectomy done by Clayman et al.

• In 1998, Janetschek et al first investigated whether laparoscopic surgery is a suitable technique for partial resection of small renal malignancies.
Partial Nephrectomy / Nephron Sparing Surgery (NSS)

- Previously only for absolute indications
- Now extended to elective indications for tumours 4cm or less with normal contralateral kidney
- Concerns about long term effect on renal function
- Comparable long term oncological outcome to total radical nephrectomy
- Open Partial Nephrectomy is still the goal standard
- Laparoscopic Partial Nephrectomy has been shown to be feasible although technically more demanding with comparable oncological outcome
Current indications for Partial Nephrectomy

Imperative
• Tumours in solitary kidneys
• Impaired function of contralateral kidney
• Bilateral synchronous tumours

Relative
• Von Hippel-Lindau (VHLD) and other forms of hereditary RCC

Elective
• Tumours 4cm or less with normal contralateral kidney
• Indeterminate cystic lesions with malignant potential

* At least 20% remnant of 1 normal kidney necessary to remain dialysis independent
Common Elective indication
Issues regarding Partial Nephrectomy

• Can comparable results and complications rates be obtained with Partial Nephrectomy?
• What is the impact of tumour size on recurrence and outcomes
• What is the ideal tumour excision margin?
Open Partial Nephrectomy – Surgical Technique (Novick AC)

- Incision through bed of 11/12th rib
- Mobilisation of the kidney and perinephric fat, leaving fat over the tumour
- Kidney placed in a bowel bag
- Regional hypothermia and renal artery occlusion in most cases
- 12.5g of IV Mannitol immediately prior to renal artery occlusion
- Renal artery clamped and kidney immediately covered in sterile ice slush
- Kidney left for 15mins to allow core temperature to drop to 20°C
- Renal vein left unclamped allowing retrograde renal oxygenation
- Anticoagulation not routinely used
- Wedge excision for most renal surface tumours
- 1cm of normal kidney should be excised, frozen section or intra op ultrasound scan performed to ensure tumour free margins
- Haemostasis using suture ligation or argon beam coagulator
- Openings into the collecting system closed with absorbable suture
- Renal parenchyma reapproximated over a haemostatic plug
- Renal artery clamp removed and haemostasis secured
Open Partial Nephrectomy – wide excision
Wide excision
Application of tissue sealant
Surgicel bolsters
## No of complications (RN versus NSS)

<table>
<thead>
<tr>
<th>Author</th>
<th>Total No. pts</th>
<th>NSS No. complications (%)</th>
<th>RN No. complications (%)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uzzo et al (1999)</td>
<td>80</td>
<td>4 (8%)</td>
<td>2 (7%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Lee et al (2000)</td>
<td>262</td>
<td>9 (11%)</td>
<td>25 (14%)</td>
<td>0.62</td>
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<tr>
<td>Lau et al (2000)</td>
<td>328</td>
<td>11 (6.7%)</td>
<td>10 (6%)</td>
<td>NR</td>
</tr>
<tr>
<td>Corman et al (2000)</td>
<td>1885</td>
<td>146 (10.5%)</td>
<td>68 (13.3%)</td>
<td>NR</td>
</tr>
<tr>
<td>Shekarriz et al (2002)</td>
<td>120</td>
<td>6 (10%)</td>
<td>2 (3.3%)</td>
<td>0.2</td>
</tr>
</tbody>
</table>
## Local Recurrence after NSS

<table>
<thead>
<tr>
<th>Author</th>
<th>Total No. pts</th>
<th>No. LR (%)</th>
<th>No. LR alone</th>
<th>No. LR + mets</th>
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<tr>
<td>Marberger et al (1981)</td>
<td>72</td>
<td>6 (8.3%)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Novick et al (1989)</td>
<td>100</td>
<td>9 (9%)</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Morgan et al (1990)</td>
<td>104</td>
<td>6 (5.7%)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Steinbach et al (1992)</td>
<td>140</td>
<td>5 (3.6%)</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Moll et al (1993)</td>
<td>142</td>
<td>2 (1.4%)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Licht et al (1994)</td>
<td>216</td>
<td>9 (4.2%)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Hafez et al (1999)</td>
<td>485</td>
<td>16 (3.2%)</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Filipas et al (2000)</td>
<td>180</td>
<td>3 (1.7%)</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Mc Kiernan et al (2002)</td>
<td>292</td>
<td>7 (12%)</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Ghavamian et al (2002)</td>
<td>76</td>
<td>7 (9.2%)</td>
<td>7</td>
<td>0</td>
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</table>
NEPHRON SPARING SURGERY FOR LOCALIZED RENAL CELL CARCINOMA: IMPACT OF TUMOR SIZE ON PATIENT SURVIVAL, TUMOR RECURRENCE AND TNM STAGING
KHALED S. HAFEZ, AMR F. FERGANY AND ANDREW C. NOVICK*
From the Department of Urology, Cleveland Clinic Foundation, Cleveland, Ohio
J. Urology 1999; 162: 1930

Table 1. Postoperative tumor recurrence according to pathological stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>No. Pts.</th>
<th>No. Recurrence (%)</th>
<th>No. Local Recurrence (%)</th>
<th>No. Local Recurrence + Metastatic Disease (%)</th>
<th>No. Metastatic Disease (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>320</td>
<td>13 (4.0)</td>
<td>0</td>
<td>1 (0.3)</td>
<td>12 (3.7)</td>
</tr>
<tr>
<td>T2</td>
<td>21</td>
<td>1 (4.8)</td>
<td>0</td>
<td>1 (4.8)</td>
<td>0</td>
</tr>
<tr>
<td>T3a</td>
<td>81</td>
<td>14 (17)</td>
<td>4 (4.9)</td>
<td>3 (3.7)</td>
<td>7 (8.6)</td>
</tr>
<tr>
<td>T3b</td>
<td>63</td>
<td>16 (25)</td>
<td>3 (4.7)</td>
<td>4 (6.3)</td>
<td>9 (14)</td>
</tr>
<tr>
<td>Totals</td>
<td>485</td>
<td>44 (9)</td>
<td>7 (1.4)</td>
<td>9 (1.8)</td>
<td>28 (5.8)</td>
</tr>
</tbody>
</table>

Fig. 3. Cancer specific survival after nephron sparing surgery for tumors 4 or less versus those more than 4 cm.
Five-year disease-free survival by tumor size in patients undergoing partial nephrectomy
A total of 44 partial nephrectomies were performed with a mean followup of 49 months (range 8 to 153). Mean tumor size was 3.22 cm. (range 1.3 to 10).

Surgical margins were negative for malignancy in 41 cases and positive in 3. All patients with negative margins were without local recurrence at followup except 1 with a recurrent mass adjacent to the kidney at a site distant from the original lesion.

Authors concluded that margin size was irrelevant. Only a minimal margin of normal renal parenchyma of less than 5 mm must be removed during partial nephrectomy for localized renal cell carcinoma.
Nephron Sparing Surgery

- Post op local recurrence 4-6%
- 5 year Ca Specific survival similar to RN
- Central vs Peripheral lesions - Novick has shown no difference in 5 yr Ca Specific Survival, recurrence, and renal function.
- Where possible nephron sparing surgery should be attempted.
Laparoscopic Partial Nephrectomy

• Recent advances in laparoscopic techniques such as intracorporeal suturing and the availability of laparoscopic vascular instruments have allowed laparoscopic partial nephrectomy to become a viable alternative to open partial nephrectomy.

• Laparoscopic partial nephrectomy is associated with less postoperative analgesic requirement, earlier hospital discharge and more rapid convalescence.
Transperitoneal (TPN) versus Retroperitoneal (RPN) Laparoscopic Partial Nephrectomy

• TPN approach preferred due to larger working space, better instrument angle for tumour excision and intracorporeal renal suture and reconstruction.

• RPN more challenging due to decrease working space but provides better access to posterior especially posteromedial tumours.

Lap Partial Nephrectomy - Technical Issues

• Technique is based on time-tested open method where the kidney is completely mobilised.

• The challenge is to achieve definitive margin free tumour excision under a bloodless field within acceptable ischaemic time followed by good haemostasis and renorrhaphy.
Hilar control and warm ischaemia

- No consensus regarding clamping method i.e en bloc, artery only, intermittent clamping and early unclamping during suturing
- Gill et al preferred en bloc clamping
- Most accept a warm ischaemic time limit of 30mins.
Renal cooling / Cold ischaemia

• Not commonly practised
• Obvious difficulties of instituting cool ischaemia
• Gill et al 1st reported in 2003, renal cooling of a kidney with a clamped hilum within an endocatch bag and using ice slush instilled via a port side
• Janetschek et al 2004 reported series of retrograde cooling via renal artery using an angiocatheter using 4C solution.
Haemostasis

• Most reliable method to achieve completely bloodless field is by clamping of hilum

• Use of radiofrequency, diathermy, argon laser has been described but associated with potential collateral damage to surrounding normal tissue. Also difficulties in distinguishing normal from tumour tissue.

  (Desai - correlation between renal function and amount of tissue excised)

• Use of biological sealant eg Floseal – studies reported lower overall and haemorrhagic complication rate
Laparoscopic vs open partial nephrectomy in consecutive patients: the Cornell experience

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BJU 96; 811-814, 2005

Mean Tumour size
OPN 3.4cm LPN 2.2cm

<table>
<thead>
<tr>
<th>Variable</th>
<th>OPN</th>
<th>LPN</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>N</td>
<td>59</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Mean (SD):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, years</td>
<td>64.2 (12.3)</td>
<td>62.1 (11.7)</td>
<td></td>
</tr>
<tr>
<td>Operative duration, min</td>
<td>239 (57.8)</td>
<td>144 (38.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Creatinine, μmol/L before partial nephrectomy</td>
<td>97 (62)</td>
<td>88 (18)</td>
<td></td>
</tr>
<tr>
<td>1 day after</td>
<td>106 (67)</td>
<td>88 (18)</td>
<td></td>
</tr>
<tr>
<td>2 days after</td>
<td>106 (68)</td>
<td>97 (27)</td>
<td></td>
</tr>
<tr>
<td>Estimated blood loss, mL</td>
<td>363 (241)</td>
<td>236 (382)</td>
<td>0.09</td>
</tr>
<tr>
<td>Pathological subtype, n</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Clear cell carcinoma</td>
<td>30</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Papillary carcinoma</td>
<td>5</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Chromophobe carcinoma</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Unclassified</td>
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<td>3</td>
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</tr>
<tr>
<td>Lymphoma</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Oncocytoma</td>
<td>10</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Benign solid/cystic lesions</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Angiomyolipoma</td>
<td>3</td>
<td>5</td>
<td></td>
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TABLE 1
The demographics and laboratory data for the LPN and OPN groups, and the pathological subtype of renal cancer
Renal/urological Complications of laparoscopic and open partial nephrectomy
(Gill et al 2003)

<table>
<thead>
<tr>
<th></th>
<th>No. Laparoscopic</th>
<th>No. Open</th>
</tr>
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<tbody>
<tr>
<td><strong>Intraop:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal hemorrhage</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Ureteral resection</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Postop:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine leakage</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Perirenal hematoma</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Renal hemorrhage, embolization</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Renal hemorrhage, nephrectomy</td>
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<td>0</td>
</tr>
<tr>
<td>Hematuria</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ureteropelvic obstruction</td>
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<td>1</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>11</td>
<td>2</td>
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</table>
Overall complications after laparoscopic and open partial nephrectomy

(Gill et al 2003)

<table>
<thead>
<tr>
<th>Complications</th>
<th>% Laparoscopic</th>
<th>% Open</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraop</td>
<td>5</td>
<td>0</td>
<td>0.03 (unconditional exact test)</td>
</tr>
<tr>
<td>Postop</td>
<td>16</td>
<td>13</td>
<td>0.55 (Pearson chi-square test)</td>
</tr>
<tr>
<td>Total No. complications:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wound</td>
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<tr>
<td>Pulmonary</td>
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<td>Cardiovascular</td>
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<td>Gastrointestinal</td>
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<tr>
<td>Thrombotic</td>
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<td>1</td>
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<tr>
<td>Renal/urological</td>
<td>7</td>
<td>2</td>
<td></td>
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</tbody>
</table>
Comparison between Laparoscopic Partial (LPN) and Open partial nephrectomy (OPN) (Gill, Kavoussi et al, J. Urol 2007)

- 3 institutions – 1800 patients, LPN 771, OPN 1029
- OPN – older pts, bigger tumours and more solitary kidneys
- Warm ischaemic time average 10mins for LPN
- Preservation of renal function – 97.9% for LPN versus 99.6% for OPN
- Overall post op complications – LPN 18.6% vs OPN 13.7%
- Haemorrhagic complications – LPN 4.2% vs OPN 1.6%
- Similar positive margins (1.6% vs 1%), local recurrence (1.4% vs 1.5%)
- Cancer specific survival at 3 years - 99.3% versus 99.2%
Partial Nephrectomy

• Open partial nephrectomy remains the gold standard
• Laparoscopic partial nephrectomy is an advanced technique that should be performed by surgeons with considerable laparoscopic experience
• In the absence of local expertise, the default operation should be open partial nephrectomy and not laparoscopic radical nephrectomy
Robotic Partial Nephrectomy (RPN)

• Increasing application in partial nephrectomy. 1\textsuperscript{st} reported by Gettman et al in 2004.

• RPN associated with longer warm ischaemic time compared to LPN (Aron, Kaouk et al BJU 2008) but not reported in other studies.

• RPN requires more trocars compared to LPN

• Wang AJ, Bhayani S Urology 2009 – compared >100 consecutive cases of RPN vs LPN
  - no difference in blood loss, tumour size, positive margin rate
  - shorter total op time (140mins vs 156mins), warm ischaemic time (19 vs 25mins) and length of stay (2.5 vs 2.9 days) for RPN
Robotic Partial Nephrectomy (RPN)

• Issues
  - More costly compared to LPN
  - Surgeon has to have significant robotic experience
  - Reliance on competent assistant with laparoscopic experience
  - Long term Oncological data yet to come

• May allow wider application of LPN since learning curve less steep compared to lap partial nephrectomy (Deane et al J. Endour 2008)
Other Minimally Invasive Surgical Options

• Cryoablative therapy
• Radiofrequency ablation
• HiFU
Follow Up of RCC
Any role for follow up post surgery?

- Rationale for
  Solitary metastasis or local recurrence amenable for surgical resection
- Rationale against
  Metastatic RCC has poor prognosis and immunotherapy has very limited success
- Most Urologists would follow up their patients
- More frequent follow up is anticipated in view of increasing prevalence of nephron sparing and laparoscopic nephrectomy
Any role for follow up post surgery?

- No consensus on
  - frequency and length of follow up
  - investigations to be done
    - symptom based or routine set tests
    - role of imaging especially CT scan in terms of yield and cost implications

- Protocols for follow up
  - most are based on individual surgeon’s preference
  - some based on pathological staging
  - prognostic normograms may be utilised
Thank you
Case Discussions
Case 1

• Asymptomatic 55 year old male, no previous medical illnesses was noted to have persistent microscopic haematuria.
• Physical Examination was unremarkable
• As part of investigation, IVU was ordered and cystoscopy done.
Case 1
Case 1

- IVU reported as normal. Cystoscopy was normal as well
- Unfortunately, no further investigations done
- Patient still has microscopic haematuria on follow up
- US kidney done – reported as complex cyst midpole right kidney
- CT scan abdomen done for further evaluation
Case 1 – CT scan
Case 1 - MRI
Case 1

- Midpole right renal tumour 3cm in diameter with no nodes or metastases

- Management options?
  - Surgical
    *no role for watchful waiting in this situation*

- Surgical options?
  - Open radical nephrectomy
  - Lap radial nephrectomy
  - Open partial nephrectomy
  - Lap partial nephrectomy

- Ideal case for nephron sparing surgery

- Surgical approach depends on available expertise and discussion with patient on their preference
Case 2

- SY is a 52 year old school teacher who presented with 1 week Hx of gross haematuria. He also has loss of apetite and loss of weight for the past 4 months

  Physical examination revealed a cachetic patient with normal chest and abdominal findings but positive Virchow’s node

- FBC and RP were normal

- CXR no metastatic lesions noted

- US abdomen – left renal tumour with multiple para aortic lymphadenopathy and ? Left renal vein thrombus
Case 2 – CT Scan
Case 2 – CT Scan
Case 2 – CT scan
Case 2 – CT scan
Case 2

• Further assessment?
  *CT scan showed normal liver with extensive paraaortic and renal hilar nodes and large solid tumour arising from the upper pole about 12cm in size. The left renal vein appear compressed.*
  *CT Thorax revealed no lung metastasis*

• Diagnosis?
  *RCC, Lymphoma, Metastases to left kidney*

• Any role for percutaneous biopsy?
  Yes

• Why?
  *Treatment for Lymphoma is chemotherapy*
Case 2

• CT guided percutaneous biopsy reported as RCC

• Staging?  
  *T2N1M0*

• Prognosis?  
  *Poor – 10% 5 year survival quoted*

• Management?  
  *Nephrectomy followed by immunotherapy*  
  *Immunotherapy alone*

• Patient agreed to have nephrectomy done 1\textsuperscript{st} before immunotherapy with interferon. Histopathology RCC with lymph nodes metastases and vascular permeation

• Patient later had immunotherapy
Case 3

- 30 year old lady with past Hx of degenerating cervical fibroid was referred with 2 months Hx of painless haematuria with clots. She does not complain of any abdominal pain, loss of apetite or loss of weight but had dyspnoea with dry cough. She also complained of difficulty passing urine.
- CT scan abdomen done showed a right renal tumour with right renal vein thrombus and multiple lung secondaries.
- Physical examination revealed a breathless, pale, cachetic lady with distended bladder.
- Hb 5.8g/dl. Creatinine 180mmol/l
- Liver function tests and coagulation profile was normal
Case 3

- Urethral catheter was inserted and gross haematuria was noted
- Bladder irrigation was commenced
- Blood transfusions were given
- Oxygen via mask
- Despite irrigation patient had persistent haematuria and required further blood transfusions
- Flexible Cystoscopy showed small clots but no bladder abnormalities. Blood stained urine seen coming through right ureteric orifice
Case 3
Case 3

- Diagnosis
  *Metastatic RCC*
  *Aggressive? Sarcomatoid variant in view of the young age of the patient*

- Management of persistent haematuria?
  *Option of palliative nephrectomy was raised*

- Is palliative nephrectomy the best option for this patient?
  *No*
  *Poor performance status*
  *Anaesthetic risks – difficulty in extubating after surgery*
  *Difficult recovery post op*
  *Increased morbidity and mortality*