

# NON-CLAMPING PARTIAL NEPHRECTOMY BY HYDRODISSECTION

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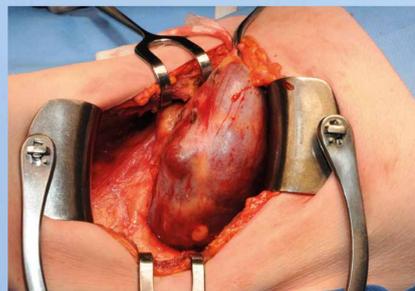
## INTRODUCTION

Open partial nephrectomy is currently the standard care in treating small renal tumors up to 4 cm in diameter. An absolute or relative indication for partial nephrectomy for larger tumors exists in patients with an anatomical or functional mono-kidney or impaired function of the contralateral kidney. Hydrodissection is a technique, which offers the possibility to operate in vulnerable, parenchymatous tissues using a fine but firm waterjet. Modulating the force of the waterjet provides tissue selectivity, which enables cutting tissue while vessels and other structures are spared.

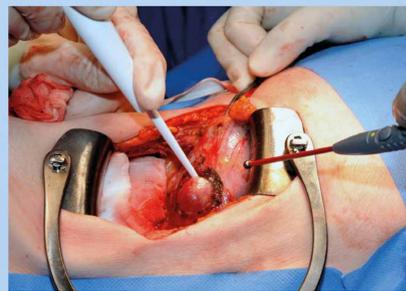
In this study this operative technique was used in partial nephrectomies.

## MATERIAL AND METHODS

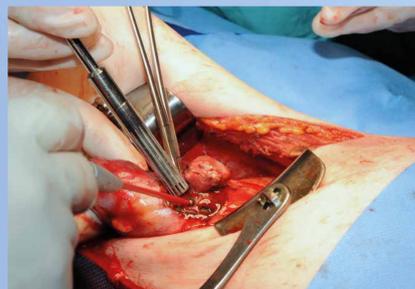
During the period from December 2003 until January 2013, 41 patients underwent 42 partial nephrectomies by hydrodissection through a small lumbar incision (pict. 1). We used the Helix Hydrojet and starting from 2011 the ERBEJET 2 (both from ERBE Elektromedizin GmbH, Germany), which combines the functions of hydrodissection coagulation and suction in one applicator (pict. 6), allowing simultaneous hydrodissection and coagulation. In this technique clamping of the renal pedicle is not necessary thus avoiding renal ischaemia. After exposing the kidney the renal capsule is incised diathermically and the tumor is excised with a water pressure of 20 bar (pict. 2). After resection of the tumor the wound surface is treated with soft coagulation (pict. 3) in combination with a surgical patch for haemostasis and tissue sealing (pict. 5).



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5



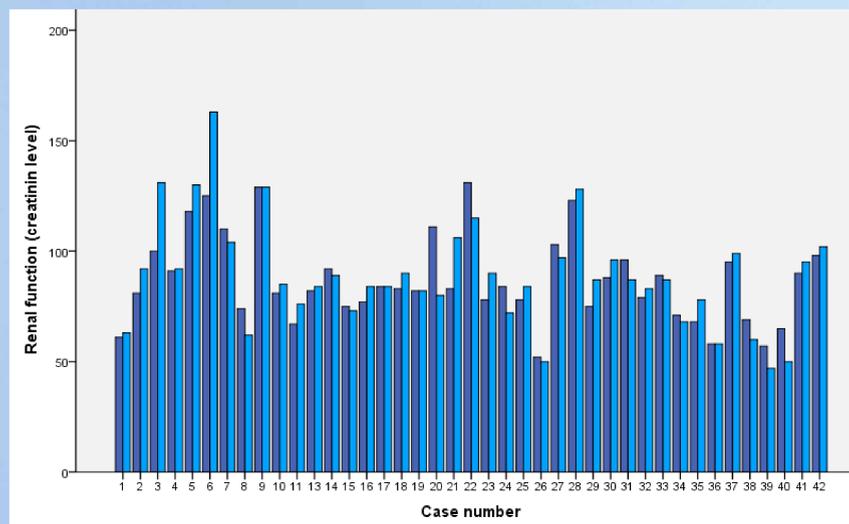
Picture 6

## RESULTS

In a group of 41 patients (20 males, 21 females, average age of 63 yr) 42 partial nephrectomies by hydrodissection were performed. In 30 out of 42 cases a renal cell carcinoma was found; 12 cases revealed a benign condition. Average operating time was 90 minutes; median blood loss was 200 ml. Median tumor size (pict. 4) was 2.5 cm (1.2–10 cm). During an observation period of 10–111 months no tumor recurrence has been detected; in the renal cancer group no recurrence was seen during a median follow up of 28 months. The kidney function was stable in 39 out of 41 cases and showed a slight reduction in two patients with a mono-kidney. Histological assessment of the resection margins turned out to be difficult in half of the cases.

## KIDNEY FUNCTION

Median difference in serum creatinin pre-post surgery is 2 micromol/liter



■ Renal function (pre)  
■ Renal function (post)  
SD 12,1, n.s. p 0,317 paired T-test  
Median difference in MDRD pre-post surgery is -2,2

## COMPLICATIONS (7,2 %)

- 1 Patient with urinary leakage, resolved after drainage (Clavien III A)
- 1 Patient had a superficial burning wound due to diathermical current leakage (Clavien II)
- 1 Patient had an urinary retention (Clavien III A)
- No secondary bleedings or re-interventions occurred

## HISTOLOGY

- Renal cell carcinoma 30 out of 42 (71,4 %)
- Benign histology 12 out of 42 (28,6 %)
- Oncocytoma: 8
- Other benign pathology: 4

## SURGICAL MARGINS

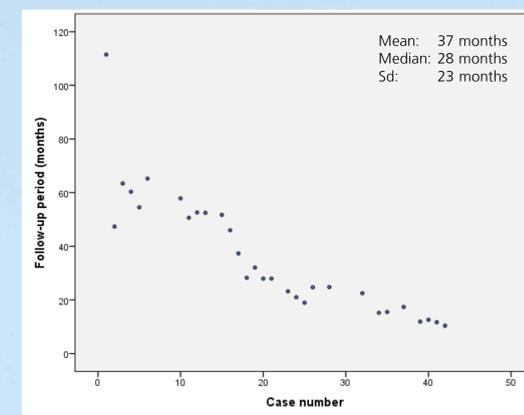
Radicality of resection according to histologic report (n=30)

- |                        |       |       |
|------------------------|-------|-------|
| • Complete             | 15/30 | 50%   |
| • Incomplete           | 10/30 | 33,3% |
| • No certain statement | 5/30  | 16,7% |

## TUMOR RECURRENCE

- None of 12 patients with a benign disorder
- None of 30 patients with renal cancer

Follow-up Period RCC patients



Median recurrence free period for renal cancer: 28 months (follow up 10–111 months, mean follow-up 37 months)

## CONCLUSION

Partial nephrectomy by hydrodissection offers the advantages of minimal blood loss, optimal intra-operative sight and relatively short operation time by tissue selective preparation. Furthermore, it is a safe technique with no tumor recurrences until now. Clamping of renal hilar vessels is avoided, which minimizes the risk of postoperative renal function reduction. Histological assessment of the tissue margins may be difficult, probably related to the precise tumor preparation by the waterjet. We advise regular post-operative radiologic controls.