

Nephrectomies: Indications, Approaches and Post-operative Morbidity at Conakry University Hospital – Guinea

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Abstract: Aim: To report the indications, the approach and the complications of nephrectomy in the urology department of the University Hospital of Conakry. Material and methods: Retrospective descriptive study of 10 years duration, from October 1, 2006 to September 30, 2016, on 34 patients who underwent nephrectomy. The parameters studied were: age, sex, operative indication, approach, type of nephrectomy, postoperative morbidity and mortality. The average follow-up was 12 months. Results: Between October 2006 and September 2016, 7064 surgical procedures were performed, including 34 nephrectomies, i.e. 0.48% of cases. Nephrectomy was indicated in 13 cases of renal tumor, 12 cases of pyeloureteral junction syndrome, 6 cases of pyonephrosis and 3 cases of American Association of Surgeons of Trauma stage IV kidney trauma.) Lumbotomy was the approach in 22 patients. Nephrectomy was extended in 16 patients and total in 18 others. We noted 4 cases of bleeding complications, 4 cases of parietal suppuration, 2 cases of death and 1 case of phlebitis. Conclusion: The indication for nephrectomy was rare in the department. The indications were varied, the most common being renal tumors and decompensated pyelo ureteral junction anomaly. Early management of renal pathologies would reduce the indication for nephrectomy.

Keywords: Nephrectomy, Indications, Surgery, Morbidities, Conakry

1. Introduction

Nephrectomy is the surgical removal of the kidney. A distinction is made between a simple nephrectomy, which involves only part or all of the organ, and an extended nephrectomy, which involves extensive removal of all the constituent parts of the renal pelvis [1].

The indications for nephrectomy are multiple and sometimes difficult to define preoperatively [2]. Classically, enlarged or radical nephrectomy is reserved for kidney cancer with a tumor volume greater than 7 cm and simple nephrectomy for irreversible renal parenchymal lesions secondary to congenital or acquired benign pathologies of

the kidney such as a pyeloureteral junction (PUJ), mega-ureter, renal or ureteral lithiasis, American Association for the Surgery of Trauma (AAST) stage IV or V kidney trauma [3–5].

Lumbotomy is preferred as it allows an extra peritoneal approach and quick and easy exposure of the renal pedicle [6].

The postoperative morbidity of nephrectomy depends on several factors such as bilateral renal involvement, single kidney, chronic kidney disease, comorbidity that may potentially compromise subsequent renal function, and even the type of nephrectomy [2].

The aim of this study was to report on the indications, approaches and complications of nephrectomy in the urology department of the University Hospital of Conakry.

2. Material and Methods

This was a retrospective descriptive study of 10 years duration, from 1 October 2006 to 30 September 2016. Thirty-four (34) patients who underwent nephrectomy were included. All patients underwent a thorough clinical examination, a biological assessment (CBC, creatinine, blood grouping, PT and TCK) and a renal ultrasound. The indication for surgery was established following the uroscan. We included all patients who underwent nephrectomy during the study period. The study variables were: frequency, age, sex, socio-professional category, reason for consultation, history, physical signs, creatininemia, urine cytobacteriological examination (UCE), medical imaging data (ultrasound, uroscan), operative indication, approach, type of nephrectomy, postoperative course. The average follow-up was 12 months. We defined simple postoperative follow-up when the patient presented no complications and complicated postoperative follow-up if he presented an intra- or postoperative complication within the first 30 days. Follow-up afterwards varied between benign pathology (0-12 months) and renal tumor (0-5 years). Frequency was obtained by the proportion of nephrectomy to other surgical techniques performed in the department during the study period.

3. Results

Between October 2006 and September 2016, 7064 surgeries were performed including 34 nephrectomies, i.e., 0.48% of cases. The mean age of the patients was 37.82 years with extremes of 10 months and 79 years. The most affected age group was 21-40 years with 32.35% (n=11) followed by 0-20 years with 26.47% (n=9) and 41-60 years with 23.53% (n=8).

Nephrectomy involved 18 male and 16 female patients with a sex ratio of 1.12.

The socio-professional categories of housewives, pupils/students and farmers were the most concerned with 38.24%, 23.53% and 17.65% of cases respectively.

The reasons for consultation were lumbar or lumbo-

abdominal pain in 26 cases (70.27%), total hematuria in 7 cases (18.91%) and fever in 4 cases (10.81%).

In the medical history, we noted 5 cases (25%) of arterial hypertension, 3 cases (15%) of diabetes, 3 cases (15%) of smoking, 1 case (5%) of obesity associated with hypertension and type 2 diabetes. Urologically, we found 2 cases (10%) of purulent urethritis, 2 cases (10%) of nephrostomy, 1 case (5%) of nephrolithotomy, ureteral reimplantation, hematuria and adenomectomy respectively.

Lumbar contact and renal flailing were seen 23 times (41.81%) and 18 times (32.72%) respectively, total hematuria 7 times (12.72%), weight loss 4 times (7.27%) and unilateral lower limb oedema 3 times (5.45%).

Creatinine levels were normal in 24 patients (70.58%). In 10 others (29.41%), it was between 107 and 195.8 $\mu\text{mol/l}$. Nephrostomy was performed in 6 patients (17.65%) to normalize creatinine levels. Preoperative parenteral rehydration was sufficient to normalize creatinine levels in the other 4 patients.

Out of 34 urine cultures 21 were positive (61.76%) and *Escherichia coli* was isolated from 12 patients (35.29%), *Proteus mirabilis* from 4 patients (11.76%), *Staphylococcus aureus* from 4 patients (11.76%) and *Klebsiella pneumoniae* from one patient (2.94%).

The medical imaging data are reported in Table 1. Figure 1, 2 and 3 illustrate the delayed diagnosis of the pyeloureteral junction defect with completely laminated renal parenchyma.

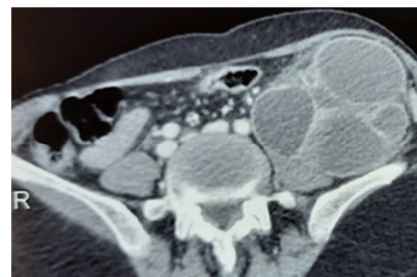


Figure 1. Uroscan of a 53-year-old Woman showing a left giant hydronephrosis with the lower limit lower than the iliac crest.

Table 1. Distribution of imaging data.

| Imaging data | Number | Percentage |
|---|--------|------------|
| <i>Ultrasound data</i> | 34 | 100% |
| Hydronephrosis | 16 | 47,06 |
| Kidney tumor | 9 | 26,47 |
| Pyelic and/or renal lithiasis + dilatation of the pyelo-caliceal cavities | 5 | 14,71 |
| Fracture + capsular rupture of kidney + urohaematoma | 2 | 5,88 |
| Left peri-renal haematoma | 1 | 2,94 |
| Large multi nodular kidney | 1 | 2,94 |
| <i>Uroscan data</i> | 34 | 100% |
| Giant hydronephrosis + destroyed renal parenchyma | 12 | 35,29 |
| Dumb kidney | 6 | 17,65 |
| Medial renal tumor | 4 | 11,76 |
| Upper polar calcified tumor of the kidney | 3 | 8,82 |
| Polar inferior renal tumor | 3 | 8,82 |
| Atypical cystic tumor BOSNIAK type IV | 3 | 8,82 |
| Multiple fracture of the right kidney stage IV+ urohaematoma | 1 | 2,94 |
| Middle third fracture of left kidney, urohaematoma | 1 | 2,94 |
| Perirenal haematoma, renal ischaemia and pedicle rupture (Stage V) | 1 | 2,94 |



Figure 2. Reconstruction image of the same patient showing absence of renal secretion.

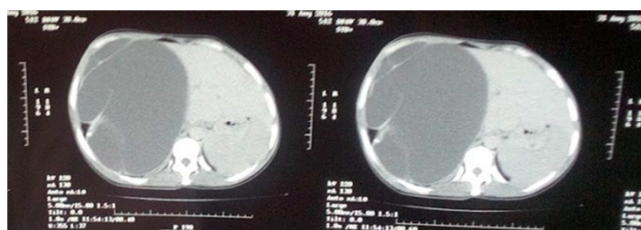


Figure 3. Coronal section of a uroscan showing significant dilatation of the pyelocal cavities with complete lamination of the right renal parenchyma.

Nephrectomy was indicated in 13 cases (38.24%) of renal tumor, 12 cases (35.29%) of pyeloureteral junction syndrome, 6 cases of pyonephrosis (17.62%) and 3 cases (8.82%) of American Association of Surgeons of Trauma stage IV kidney trauma.) It was right in 24 patients and left in 10. Lumbotomy was the approach in 22 cases, laparotomy and para-rectal incision each accounted for 6 cases. We performed total nephrectomy in 19 patients, 12 of whom had decompensated pyeloureteral junction syndrome, 2 cases of renal tumor and 3 cases of Pyo nephrosis. Nephrectomy was extended in 12 patients, 11 of whom had renal tumors and 1 had pyo nephrosis. Figure 5 shows an enlarged nephrectomy for a renal tumor classified as T4N2M0. The nephrectomy was subcapsular in 3 others, including 2 cases of pyo nephrosis and one case of trauma to the kidney.



Figure 4. Surgical specimen of the right pyeloureteral junction anomaly seen on the uroscan of Figure 3.



Figure 5. Surgical specimen of an enlarged nephrectomy for a renal tumor invading the adrenal gland and perirenal fat.

The postoperative course was simple in 67.65% (n=23), complicated in 32.35% (n=11). Among the complications, hemorrhagic and infectious complications were of the order of 11.76% (n=4) in each case, one case of phlebitis and the mortality rate was 5.88% (n=2).

The average length of stay (LOS) was 12.51 days (1 day and 32 days). The length of stay varied between 8 and 15 days in 64.70% of patients. There were no long-term complications such as renal failure; however, a tumor recurrence was recorded in one patient at 12 months.

The anatomical-pathological examination of the surgical specimens concluded with the data in table 2.

Table 2. Results of the anatomopathological examination of the pieces of surgery.

| Anatomopathological examination | Number | Percentage |
|---|--------|------------|
| Dysplastic remodelling of the pyeloureteral junction | 12 | 35,29 |
| Clear cell renal carcinoma | 6 | 17,65 |
| Chronic lithiasis pyelonephritis | 4 | 11,76 |
| Cystic renal cell dysplasia | 3 | 8,82 |
| Tubulopapillary carcinoma | 2 | 5,88 |
| Nephroblastoma | 2 | 5,88 |
| Fibro-inflammatory remodeling of the right ureteral portion + Nephritis | 2 | 5,88 |
| Traumatic kidney injury with inflammatory reaction | 2 | 5,88 |
| Ischemic remodeling of the renal tissue | 1 | 2,94 |
| Total | 34 | 100 |

4. Discussion

Nephrectomy was a rare indication (0.48%) but not negligible in a country where renal transplantation is not yet feasible. This rate does not reflect the frequency of indications for nephrectomy since some patients arrive in the department in a metastatic tumor stage or in a state of sepsis or even uremic coma and die in the preoperative unit. Our results were inferior to those of Coulibaly et al [2] in Mali who reported 46 patients out of 1078 operated, i.e., 4.26% of nephrectomies, or of Rafique et al [5] in Pakistan who reported a nephrectomy rate of 3.21% (154 cases/4786 urological procedures).

It concerned all ages with a predominance of young subjects: 32.35% were between 21 and 40 years old and the average age was 37.82 years. Ndoye et al [3] in Senegal reported an average age of 45 years with extremes of 3 years and 87 years. Coulibaly et al [2] reported a mean age of 42.17 years (1 year and 81 years). This diversity of age is linked to the fact that nephrectomies were performed for both acquired and congenital pathologies.

A male predominance (52.94%) was observed with a sex ratio of 1.12. Fall et al [7] noted a slight female predominance (51.3%) with a sex ratio of 0.94. For Verhoest et al [8] in a series of 691 partial nephrectomies including 558 malignant tumors, men represented 66.7% of cases. Diallo et al [9] in a series of 19 cases of pyonephrosis, noted a male predominance with 11 men (58%) against 8 women (42%) and a sex ratio of 1.37. Similarly, a male predominance was noted in 54.3% of cases in a series of 35 cases of pyeloureteral junction anomaly by Tembely et al [10]. Ezomike et al [11] in a series of 52 nephrectomies in subjects under 16 years of age also noted a male predominance of 61.54% (n=32).

No incidental findings in our series as in most western series where the finding was incidental in more than 72% of the cases of kidney cancer [12, 13] thanks to the population's access to advanced medical imaging [CT, MRI] favoring an early diagnosis. In an analysis of 5281 kidney cancer patients, Byun et al [12] recorded incidental findings in 76.9% (n=4048). In sub-Saharan Africa, the symptomatology is often indicative of both cancerous and benign renal disease. Ndoye et al [3] reported 41% lumbar pain, 11% flank pain and 18% hematuria. Coulibaly et al [2] reported a lumbar mass in 19 cases (41.3%), lumbar pain in 16 cases (34.8%), urinary tract infection in 8 cases (17.4%) and hematuria in 3 cases (6.5%).

In the history, we found risk factors for kidney cancer such as hypertension, smoking and obesity in the order of 25%, 15% and 5% respectively. We also recorded factors predictive of nephrectomy such as failed uretero-vesical re-implantation in 5% of cases. Byun et al [12] reported hypertension in 38.5% (n=1883), active smoking in 19.6% (n=738), diabetes in 14.9% (n=736). Ndoye et al [3] found hypertension, diabetes, pyeloplasty and uretero-vesical re-implantation in 40.6% (n=15), 16.2% (n=6), 5.4% (n=2)

and 5.4% (n=2) respectively.

Physical examination revealed a large kidney in 41.81% (n=23) and hematuria in 12.72% (n=7) in our series. Tembely et al [10] reported a large kidney in 25.7% of cases. Tengue et al [14] found a large kidney in 65.6% of cases. This difference could be explained by the time of consultation and the nosologically entities treated.

The medical imaging data (table 1) confirmed the performance of the uro scan in the detection of renal tumors (9 cases on ultrasound vs. 13 on uroscan) by specifying their location and size and by distinguishing cystic tumors from other pyelocalic dilatations. In addition to this contribution, the arterial phase uro scan is able to distinguish clear cell renal cell carcinoma from papillary renal cell carcinoma with an accuracy of 95.7%, sensitivity and specificity of 98.3% and 92%, respectively [15]. The former appears as a hyper vascular tissue mass with heterogeneity due to cystic or necrotic components while the latter is usually homogeneous and hypo vascular [15].

MRI performs better than uroscan even in small renal masses where its sensitivity reaches 88.1% and its specificity 33.3% versus 79.7% and 44.4% respectively for uro scan [16].

Nephrectomy was indicated for malignant renal tumor in 38.24% of cases, for benign pathology in 61.76% of cases, either for pyeloureteral junction syndrome with destruction of the parenchyma (35.29%), lithiasis or non-lithiasis pyonephrosis (17.64%) or for renal trauma (8.82%). This predominance of nephrectomies for benign pathology was reported by Rafique [5] with 76.62% (n=118), by Ndoye [3] with 52.31% (n=34). On the other hand Coulibaly [2] found a slight predominance of malignant renal tumors with 52.2%. It follows from these four studies that congenital obstructive uropathies or lithiasis occupy an important place in the etiologies of nephrectomy and early management of these pathologies would have made it possible to avoid nephrectomy. Similarly, extended nephrectomy for renal tumors is now reserved for tumors larger than 7 cm [13].

The right kidney was most involved in 70.60% compared to 29.40% of the left kidney. There was no indication for bilateral nephrectomy as in the case of Amrani [17]. Our results are superior to those of Ndoye et al. [3] who reported a predominance of the right side of 58.5%.

The approach was a lumbotomy in 64.70% of cases in our series compared to 53.8% for Ndoye [3]. We preferentially used this approach in junction syndrome and pyonephrosis because it avoids seeding the peritoneal cavity with infection. Laparotomy is used more in kidney trauma and in renal tumours because of the ease of control of the renal pedicle and the possibility of exploring the intra-abdominal organs. This therapeutic approach is that of Rafique [5] in Pakistan who favours the trans-peritoneal route in malignant kidney tumours and the extra-peritoneal route in benign renal pathologies.

There is a match between the type of nephrectomy performed and the operative indication. Of the 12 cases of

enlarged nephrectomy, 11 were renal tumours and 19 cases of total nephrectomy, 12 of which were cases of decompensated pyeloureteral junction syndrome.

Nephrectomy is not a trivial surgical procedure: its immediate postoperative mortality can be high and has been estimated at 4.2% in patients with metastatic renal cancer [18]. Post-nephrectomy morbidity varies depending on whether it is performed for localised or metastatic malignant renal tumor or benign renal pathology. It varied from 13.8% to 7.6% for Rafique [5]. It remained high in our series, 32.35% (n=11), including 5.88% mortality.

The average duration of hospitalisation in our series was close to that of Andualet [4] who reported 19.5 days (7 - 45 days) or Stang [19] who found 13.75 days with extremes of 11 and 19 days. Laparoscopic or robot-assisted nephrectomy could offer a shorter hospital stay even if it requires equipment and a learning curve.

5. Conclusion

The indications for nephrectomy are varied, dominated in our study by so-called benign congenital or acquired pathologies with destruction of the renal parenchyma and malignant tumor pathologies. Lumbotomy was the most commonly used approach. Nephrectomy was total, enlarged and subcapsular depending on the different renal pathologies for which it was indicated. Postoperative morbidity was dominated by hemorrhagic complications and parietal suppuration. Mortality was not negligible. Early management of renal pathologies would reduce this indication for nephrectomy in a country where renal transplantation is not feasible.

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