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Surgical Treatment of Upper Urinary Tract Lithiasis in Conakry

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Abstract

Introduction: The management of urinary lithiasis in our settings has long been conventional surgery. The recent introduction of endoscopy of the upper urinary tract represents a major advance in our department. The aim was to contribute to the study of the treatment of lithiasis of the upper urinary tract in Conakry and to report on our initial experience of ureteroscopy in Conakry. **Methodology:** This is a prospective descriptive study lasting one year, from January 1 to December 31, 2022, carried out at the Urology Department of the Ignace Deen National Hospital and at the PERCHIN Urological Clinic. The study included all patients treated surgically for lithiasis of the upper urinary tract who met the selection criteria. **Results:** The study included 57 patients. The mean age was 30 years, with extremes of 20 and 73 years; the most represented age group was 31 to 40 years, followed by 20 to 30 years with 29.9% and 26.3% respectively. Males predominated in 36 cases (63.15%), with a M/F sex ratio of 1.71. Left-sided renal colic was the most common, at 75.43% (n=43), and right-sided renal colic at 40.35%, associated with digestive signs at 43.85%. 77.19% had normal creatinine levels before surgery, versus 22.81% with elevated creatinine levels, *i.e.* 15.78% improvement in renal function after surgery. Urinary tract infection was found in 47.36%, and Escherichia coli in 31.57%, followed by staphylococcus aureus in 8.77%. Overall, 82.45% of patients had organic damage to the kidneys or ureters. Right ureterohydronephrosis was noted in 56.14%, followed by left hydronephrosis in 26.32%. Open surgery was predominant in 52.63% of cases, with endoscopic surgery (URS) accounting for a significant 47.36% during the study period. The endoscopic treatment used was laser ureteroscopy. In our study, 73.68% underwent drainage of the upper excretory tract, including 64.91% with a JJ catheter. The average length of stay was 07 days, with extremes of 02 and 28 days, and 81.4% of patients who underwent URS had a length of stay of less than 4 days.

Conventional surgery had the highest complication rate (14.28%). The stone free rate for the two surgical treatment methods (open and endoscopic surgery) was 73% and 92.59%.

Keywords

Urinary Lithiasis, Surgical Treatment, Ureteroscopy, Upper Urinary Tract, Conakry

1. Introduction

Upper urinary tract lithiasis is the presence in the upper urinary tract of a solid concretion resulting from the crystallization of elements normally dissolved in the urine [1]. Urinary lithiasis affects around 13% of men and 6% of women [1]. Diagnosis remains easy, thanks to the contribution of medical imaging. These examinations can be used to diagnose urinary lithiasis, to show where it occurs and whether or not it has an impact upstream of the obstruction, to detect any associated anatomical anomalies, and to specify the choice of technique. The direct surgical approach via ureterolithotomy or pyelolithotomy is now obsolete as a first-line treatment for lithiasis of the upper urinary tract [2]. According to the AFU, in 1985, in a single-center retrospective study carried out in France, extracorporeal lithotripsy (ECL) accounted for 85.6% of procedures, compared with only 4.4% for flexible ureteroscopy (SUS). However, since 2007, SUS has become the main surgical method for treating UHU [3].

In many low-income countries, conventional surgery is still the norm, while minimally invasive treatment methods are virtually non-existent.

In Tunisia, analysis of the different modes of stone extraction in a 2012 study by A. Alayaa *et al.*, showed that conventional surgery was the most widely used method, being performed in 83.3% of cases, compared with 12.7% of LEC treatment, 1.8% of ureteroscopy and 2.3% of spontaneous expulsion [4]. In Cameroon, a study published by Zoung-Kanyi j *et al.* showed that conventional surgery for lithiasis of the upper urinary tract was performed in 96% of cases, due to their modest equipment, and that most of their patients consulted at the complication stage [5]. Today, endo-urology (rigid or flexible ureteroscopy) and minimally invasive techniques (LPC and LEC) are the standard treatments for lithiasis of the upper urinary tract [5]. However, these techniques can either fail in the case of encrusted or hard stones, or appear inappropriate for the management of large stones, which would require multiple, morbid and costly interventions. In such cases, open surgery remains the treatment of choice. The indications for open surgery for urinary calculi are, in fact, failures or complications of other techniques, calculi larger than 20 mm, hard calculi (cystine), associated anatomical anomalies, combination of complex calculi and anatomical anomalies [6] [7].

2. Methodology

Two sites in downtown Conakry were chosen for this study: the Urology-Andrology Department of the Ignace Deen National Hospital in Conakry, and a private medical center staffed by practitioners from the Urology-Andrology Department of the Ignace Deen Hospital.

This was a prospective study lasting one year, and we included all patients treated for lithiasis of the upper urinary tract surgically during our study period, which ran from 2023. Our surgical treatment consisted of open surgery and rigid and flexible ureteroscopy; other surgical techniques for the management of lithiasis will not be discussed in this article as they are not available. All patients were admitted to one or other of the management centers, and had undergone an imaging work-up, in particular an abdomino-pelvic CT scan, to establish the diagnosis of upper urinary tract lithiasis. Our study variables covered clinical, biological, imaging, surgical and evolutionary techniques. We carried out exhaustive recruitment of all patients managed for upper urinary tract lithiasis during the study period. The number of patients who met the selection criteria constituted our sample size. We used the Clavien classification for postoperative complications. Our judgment criteria, Our patients were followed up by postoperative clinical and ultrasound monitoring between 06 and 18 months. The visual analog scale (VAS) was used to characterize postoperative pain during follow-up in all our patients. Results were judged to be good if the stone was absent on imaging and the painful symptomatology disappeared; fair if a residual fragment was present without obstruction; and poor if stone extraction failed or obstructive residual fragments were present. Our data were collected using a pre-established survey form and analyzed with Epi Info version 3.5 software. Results were presented in the form of tables, text and figures.

3. Results

In our study, 57 patients suffering from lithiasis of the upper urinary tract had undergone surgical treatment during the study period. The average age was 30 years, with extremes ranging from 20 to 73 years. The most represented age group was 31 to 40 years (n = 17), followed by 20 to 30 years (n = 15), with 29.9% and 26.3% of cases respectively (Table 1). We recorded 36 male and 21 female cases in our study, with a male predominance of 63.15% and a M/F sex ratio of 1.71.

Cytobacteriological examination of urine: Urine sterility was found in 52.63% of cases; Escherichia coli was the germ most incriminated in urinary tract infections in 31.57% of cases, followed by Staphylococcus aureus in 8.77% of cases. Urine sterility was checked 10 days prior to surgery; all urinary tract infections were treated with the appropriate antibiotic.

Operating complications: Complications depend on the type of surgery, the surgeon's experience and habit. Three patients had a complication of intraoperative haemorrhage during conventional surgery, requiring intraoperative blood transfusion. During rigid ureteroscopy, a ureteral lesion was recognized during

Table 1. Age distribution of patients.

Age brackets	Workforce	Percentage
20 - 30	15	26.31
31- 40	17	29.90
41- 50	09	15.78
51- 60	11	19.29
61- 70	04	7.01
71 - 80	01	1.75
Total	**57**	**100.00**

laser fragmentation of the calculus. Internal drainage through a tumor stent was performed in this ureteral lesion. In four (4) cases of urinary fistula, two of which persisted beyond three weeks, a double-J catheter with fistulorrhaphy was inserted in the operating room. Seven 07 (12.28%) cases of surgical site infection during conventional surgery. In the comparison of the two surgical methods, in terms of complications, conventional surgery was the most frequent, with one case of intraoperative haemorrhage requiring transfusion of two packed red blood cells, and one case of postoperative haemorrhage No case of death was recorded that could be attributable to urinary lithiasis surgery in our center. During rigid ureteroscopy, ureteral injury occurred during laser fragmentation of the calculus. The placement of a tumor stent enabled us to avoid postoperative complications. Conventional surgery in our study had a higher complication rate. This corroborates data from the literature, which states that major intraoperative complications were significantly more frequent in open surgery, ranging from 16% to 38% [8], which are comparable to our results. The rate of post-operative complications was higher in conventional surgery, with surgical site infections in the forefront. Two cases of urinary fistula persisted beyond three weeks, the first despite repeated visits to the operating room (02 times), and the second with a double J catheter and fistulorrhaphy. Despite the recent availability of this technique in the arsenal for the management of lithiasis of the upper urinary tract, we had virtually no postoperative complications in our series. Conventional surgery was more morbid in our study, superimposed on the study by E. Lechevalier *et al.* [9] that the main postoperative morbidities of conventional upper urinary tract surgery for lithiasis were urinary fistulas, ureteral strictures, recurrent urinary tract infections and surgical site infections (**Table 2**). Among the seventeen patients who developed post-operative complications, Clavien grade I was the most common. The average length of stay was 07 days, with extremes of 02 and 28 days. (**Table 3**). Among the 27 patients who underwent endoscopic ureteroscopic treatment, the length of stay was less than 4 days. Many authors in sub-Saharan Africa had reported similar frequencies, notably FALL B. *et al.* [10] in Dakar and F. Lactergérie [11] respectively; 2.30, 4.5 and 2.9 days in their studies.

Table 2. Breakdown of patients according to conduct before post-operative complications.

Rank	Proper conduct	Number	Percentage
I	Daily dressing	07	12.28
	Analgesic	03	05.26
	SNG placement	01	01.75
	Blood transfusion	01	01.75
IIIb	Nephrectomy	01	01.75
	Fistulorraphy + JJ catheter insertion	04	07.01

Table 3. Breakdown of patients by length of stay.

Length of stay	Methods	
	Conventional surgery	Endoscopic surgery
<4 days	-	22 (38.59%)
Between 4 and 7 days	04 (7.01%) 20 (35.08%)	05 (8.77%) -
Between 8 and 10 days	02 (3.50%)	-
Between 11 and 20 days	04 (7.01%)	-

4. Discussion

For a long time in our region, whether in private or public practice, the treatment of urinary lithiasis was exclusively conventional surgery. The average age was 30 years, with extremes ranging from 20 to 73 years (Table 1); the same results have been reported by some authors in the Maghreb, notably in Tunisia in the study by Alayaa in 2012, with an average age of 47.4 years, and by M, bah in Senegal, who reported an average age of 35 years [4]. In the management of these lithiases of the upper urinary tract, young people were the most represented; this high representation could be explained on the one hand by changes in dietary habits and on the other by the sedentary lifestyle of the younger generation. Increasingly, many of our patients are requesting minimally invasive treatment. We noted a predominance of males and could find no explanation for this situation. The clinical expression of upper urinary tract lithiasis varies from one individual to another, and the intensity of pain symptoms depends on the degree of obstruction of the upper excretory tract. Lumbar pain was the main symptom in our study, and the left side was the most affected (Figure 1), with digestive disorders taking a back seat. While renal colic has the advantage of rapidly establishing the diagnosis of lithiasis, atypical pain or its association with digestive signs can sometimes pose problems of differential diagnosis. In our experience, this may explain the delay in diagnosis and treatment, as patients are treated for other conditions. Urine analysis was systematically performed prior to surgical treatment, and 47.36% of cases had a urinary tract infection. Antibiotic prophylaxis in accordance with the protocol of the

French Urological Association (AFU) was carried out prior to treatment of urinary lithiasis. The germ was dominated by *Escherichia Coli*, followed by *Staphylococcus aureus*. The same finding was made by T. Rachid *et al.* [12] in Casablanca, who reported 49% of urinary tract infections, and *Escherichia Coli* was found in 64.51%. Two situations could explain this high frequency of these germs: on the one hand, they are the most frequently encountered uropathogenic germs, and on the other, the presence of lithiasis constitutes a matrix for microbial proliferation, which explains the relatively high frequency in our study. The expression of symptoms in lithiasis depends on the location and degree of obstruction of the upper excretory tract by the stone. Pyloric localization was in the majority in this study (Table 4), and an injection-free abdomino-pelvic TDM scan was carried out systematically or in addition to ultrasound of the urinary tract, which has the advantage not only of establishing the diagnosis and the impact on the urinary tract, but also of setting the therapeutic indication. Indications for conventional surgery or ureteroscopy at one or other of the treatment centers depended on the patient's financial resources, which explains why conventional surgery plays such an important role in the management of lithiasis of the upper urinary tract. In our

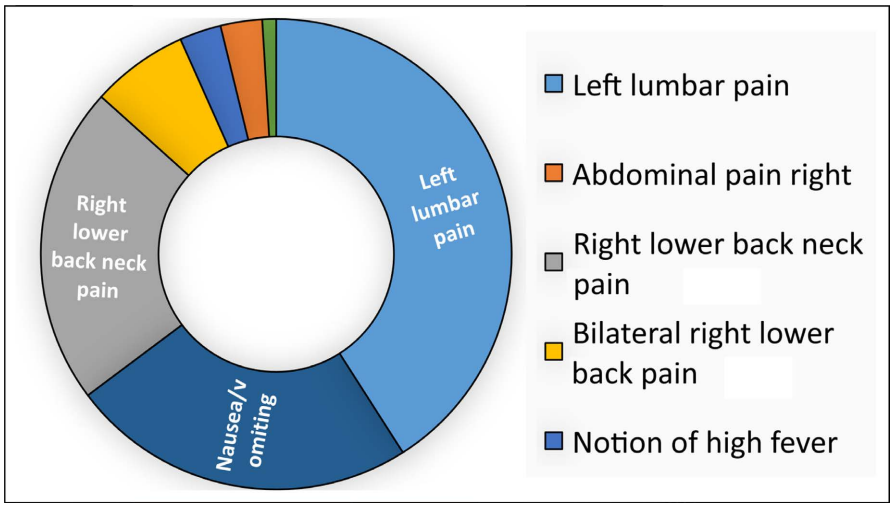

Figure 1. Breakdown of patients by reason for consultation.

Table 4. Distribution of patients by location of calculus.

Location of the calculation	Number	Percentage
Renal calcium lithiasis	18	
Superior	10	31.57
Middle	03	
Lower	05	
	29	50.87
Pyloric lithiasis	10	17.54
Ureteral lithiasis	**57**	100.00

study, 30 patients (52.86%) underwent conventional surgery, including right nephrectomy for right pyloric lithiasis complicated by right pyonephrosis. The endoscopic treatment used was flexible ureterorenoscopy and rigid laser ureteroscopy; other minimally invasive techniques (NLPC, LEC) were not used due to lack of availability in the department. Nowadays, with the advent of minimally invasive techniques, indications for conventional surgery for lithiasis have become rare in developed countries (Table 5). Almost all ureteroscopies were performed at the second referral center, where all resources were available. Conventional surgery was performed in the urology department when the patient could not afford ureteroscopy in a private center for endoscopically indicated lithiasis. Despite the evolution of techniques for the management of lithiasis of the upper urinary tract over the last thirty (30) years, and taking into account the recommendations of the World Health Organization (WHO), it is important to note that this technique is still the most widely used. American and European guidelines [13] [14] and reports from the French Urology Association [15], there is still much progress to be made in terms of treatment in our health facilities. The use of ureteroscopy is recent in Conakry, with the first ureteroscopies performed in October 2021 during an endo-urology workshop organized in the department. Prior to this, conventional surgery was the only method of stone treatment in the department. Today, the Urology Department has only a rigid ureteroscope, with no means of stone fragmentation. Most endoscopic stone treatment in Conakry is carried out at the PERCHIN clinic. Equipping the department with stone fragmentation equipment will reduce the need for open surgery in Conakry. Fifteen years ago, in the urology department (in 2008), 96.14% of patients undergoing lithiasis surgery had recourse to conventional surgery, the same approach used by Kambou in 91.81% of cases [16]. The high frequency of conventional surgery may be linked to the lack of endoscopic equipment in the public sector, the socio-economic precariousness of certain patients, and a lack of information on this

Table 5. Breakdown of patients by surgical indication.

Indications	Number	Percentage
flexible ureterorenoscopy	05	8.77%
Rigid ureteroscopy	22	38.59%
Right nephrolithotomy	01	1.75%
Left nephrolithotomy	02	3.50%
Total nephrectomy	01	1.75%
Right pyelolithotomy	07	12.28%
Left pyelolithotomy	12	21.05%
Pyelolithotomy+ Pyeloplasty	01	1.75%
Ureolithotomy	06	10.52%
TOTAL	**57**	**100.00**

new method of managing urinary lithiasis among the general population. In general, complications depend on the type of surgery, and the surgeon's experience and experience. Despite the recent introduction of ureteroscopy, we had fewer complications, with only two surgeons able to perform this technique in the department. We had a fragment-free rate of 73.3 and 92.58% (Table 6), which seems to agree to some extent with other studies that state that the stone-free rate is between 96 and 100% [11] [17]-[19]. The hard consistency of the stone, the unique location of the stone in the urinary tree, and the surgeon's experience will explain the result of this study.

Table 6. Breakdown of patients by outcome according to treatment method.

Results	Methods	
	Conventional surgery	Endoscopic surgery
Fine	22 (73.34%)	25(93.59%)
Medium	05 (16.66%)	02(7.40%)
Bad	03 (10.00%)	-
TOTAL	30 (100%)	27 (100%)

Study limitation: carried out in a context where not all techniques for the management of urinary lithiasis are available, sometimes the indication and operative technique depended on the technical resources available, and to a certain extent, management depended on the financial means to afford ureteroscopy in a private center.

5. Conclusion

Endoscopic surgery played a significant role in the treatment of upper urinary tract lithiasis in our study. The recent introduction of ureteroscopy in Conakry represents an important advance in the surgical treatment of lithiasis of the upper urinary tract. Most of the patient population was young male. The predominant manifestation of lithiasis was lumbar pain. Pyloric localization was more frequent in our study (50.87% of cases overall). Open surgery was the most frequent source of complications. No major complications were observed after endoscopic surgery. The overall fragment-free (SF) rate for all three methods was 73% and 92.59% respectively. Our patients who benefited from endo-urological treatment of the upper urinary tract had a significantly shorter hospital stay. No case of death was recorded after treatment of urinary lithiasis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Daudon, M. et Jungers, P. (1989) Lithiase urinaire. *Flammarion-Médecine Sciences*,

9, 338-439.

[2] Schoenig, A., Vedrine, N., Costilles, T., Boiteux, J.-P. and Guy, L. (2014) Évaluation de la douleur lors d'une séance de lithotripsie extra-corporelle. *Progrès en Urologie*, **24**, 777-782. https://doi.org/10.1016/j.purol.2014.06.006

[3] Doizi, S., Raynal, G. and Traxer, O. (2015) Évolution du traitement chirurgical de la lithiase urinaire sur 30ans dans un centre hospitalo-universitaire. *Progrès en Urologie*, **25**, 543-548. https://doi.org/10.1016/j.purol.2015.05.002

[4] Alaya, A., Hellara, I., Belgith, M., Nouri, A., Hellara, W., Neffati, F., *et al.* (2012) Étude de la composition des calculs urinaires en fonction de l'âge dans la population du centre tunisien. *Progrès en Urologie*, **22**, 938-944. https://doi.org/10.1016/j.purol.2012.07.010

[5] Zoung Kanyi, J. and Sow, M. (1990) La lithiase urinaire au Cameroun, considérations étiopathogéniques, cliniques et thérapeutiques. A propos de 118 cas. *Médecine d'Afrique Noire*, **37**, 176-182.

[6] Conort, P., Dore, B. and Saussine, C. (2004) Prise charge urologique des calculs rénaux et urétéraux. *Progrès en Urologie*, **14**, 1096-1102.

[7] Bichler, K.H., Lahme, S. and Strohmaier, W.L. (1997) Indications for Open Stone Removal of Urinary Calculi. *Urologia Internationalis*, **59**, 102-108. https://doi.org/10.1159/000283037

[8] Paik, M.L. and Resnick, M.I. (2000) Is There a Role for Open Stone Surgery? *Urologic Clinics of North America*, **27**, 323-331. https://doi.org/10.1016/s0094-0143(05)70261-5

[9] Bichler, K.H., Lahme, S. and Strohmaier, W.L. (1997) Indications for Open Stone Removal of Urinary Calculi. *Urologia Internationalis*, **59**, 102-108. https://doi.org/10.1159/000283037

[10] Fall, B., Mouracade, P., Bergerat, S. and Saussine, C. (2014) L'urétéroscopie souple-laser dans le traitement des calculs du rein et de l'uretère: Indications, morbidité et résultats. *Progrès en Urologie*, **24**, 771-776. https://doi.org/10.1016/j.purol.2014.06.007

[11] Laclergerie, F., Jacquemet, B., Guichard, G., Bernardini, S., Chabannes, E., Martin, L., *et al.* (2014) Urétérorénoscopie souple avec laser Holmium-YAG dans la prise en charge des lithiases urinaires chez le patient obèse: Résultats d'une cohorte monocentrique. *Progrès en Urologie*, **24**, 634-639. https://doi.org/10.1016/j.purol.2014.03.005

[12] Rachidi, T. and Rabii, R. (2011) Traitement chirurgical de la lithiase coralliforme: A propos de 85 cas. Service d'urologie. CHU Ibn Rochd. Casablanca, Faculté de Médecine et de Pharmacie–Marrakech, Thèse N 137/. http://toubkal.imist.ma/handle/123456789/20059

[13] Lechevallier, E., Saussine, C. and Traxer, O. (2008) Préface. *Progrès en Urologie*, **18**, 801. https://doi.org/10.1016/j.purol.2008.09.010

[14] Faïs, P., Albert, T. and Gaillet, S. (2011) Urétérorénoscopie souple laser pour calcul du haut appareil urinaire. *Progrès en Urologie*, **21**, 811-815. https://doi.org/10.1016/j.purol.2011.10.001

[15] Lechevallier, E., Saussine, C. and Traxer, O. (2008) Urétéroscopie pour calcul du haut appareil urinaire. *Progrès en Urologie*, **18**, 912-916. https://doi.org/10.1016/j.purol.2008.09.022

[16] Kambou, T., Traore, A., Zango, B., Bon Koungou, T., Ouattara, T. et Sanou, A. (2005) La lithiase du haut appareil urinaire au C.H.U SANOU SOURO de Bobo Dioulasso

(Burkina Faso): À propos de 110 cas. *African Journal of Urology*, **11**, 55-60.

[17] Paik, M.L., Wainstein, M.A., Spirnak, J.P., Hampel, N. and Resnick, M.I. (1998) Current Indications for Open Stone Surgery in the Treatment of Renal and Ureteral Calculi. *Journal of Urology*, **159**, 374-379. https://doi.org/10.1016/s0022-5347(01)63922-3

[18] Preminger, G.M., Tiselius, H., Assimos, D.G., Alken, P., Buck, C., Gallucci, M., *et al.* (2007) 2007 Guideline for the Management of Ureteral Calculi. *Journal of Urology*, **178**, 2418-2434. https://doi.org/10.1016/j.juro.2007.09.107

[19] Türk, C., Knoll, T., Petrik, A., Sarica, K., Skolarikos, A., Straub, M., *et al.* (2016) Guidelines on Urolithiasis. *EAU Guidelines*, **69**, 468-474. https://doi.org/10.1016/j.eururo.2015.07.040

Survey Sheet *N*.....

I-General Information

Full name.....

Age.....

Sex: Male..... Female.....

II. Clinical Information

ATCD.....

Risk Factors.....

Reasons for consultation

Abdominal pain: yes....., no……..., ……..Characteristic.....

Digestive disturbances: nausea, vomiting.....;

General signs: fever.....; AEG....

III. Biochemical Variables

Creatininemia: normal.....; elevated.....

Phosphocalcic balance:

Blood calcium: normal...; elevated..... Magnesemia.....

Urinary pH.....

Phosphoremia: Normal.....; elevated.....

Urea: Normal..... High.....

ECBU + ATB:

Germs: Yes..... No.....

Germ name:..... Sensitive drugs.....

IV. Radiologic Variables

Ultrasound/ASP: number of stone.....; stone localization.....; dilatation upstream of lithiasis: yes..... No.....

Renal parenchymal status.....; stone size.....

Affected side: Right kidney...; Left kidney.....; Bilateral.....

Right ureter.....; Left ureter.....; Bilateral.

Associated abnormalities.....

Uroscanner: calculus number one.....; two.....; more than two.....

Stone localization: superior calyx...; middle.....; inferior.....

Upstream dilation: No..... if yes.....; segment reaches.....

State of renal parenchyma.....; stone size.....

Affected side: right...; left.....; bilateral.....

Associated abnormality.....

V. Therapeutic Variables

Indications.....

Approaches.....

The operative technique; nephrolithotomy.....; Pyelolithotomy.....;
Ureterolithotomy....., soft ureteroscopy.....
Types of anesthesia: spinal anesthesia.....; general anesthesia.....
Intraoperative incidents and accidents
Hemorrhage.....
Type of drainage: internal.....; external.....; duration.....; amount of fluid in 24 h.....
Postoperative complications:
Early:.....
Late.....
Associated gestures: No..... if Yes.....; specify.....
Length of stay: inf to 7 jrs 7 to 10 jrs; 10 to 15 jrs
Outcomes:
Good:
Satisfactory:
Poor:
Setback:
Check before 6 months.....
check before one year.....
check before 18 months.....
Lost.....