

# Interventional Ultrasound in Ambulatory Urological Practice: Experience of the Medicis Clinic in Conakry

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## Abstract

**Introduction:** Minimally invasive urological interventions have long been practiced blindly in our context. The popularization of ultrasound in urological practice has contributed to changing habits by making the procedures safer and more effective. The objective of this work was to study the technical aspects, indications and results of minimally invasive urological procedures guided by ultrasound. **Material and methods:** This was a prospective descriptive study lasting 1 year from January to December 2023 at the Médicis clinic in Conakry. **Results:** We carried out 126 ultrasound-guided urological interventions in one year, including 6 percutaneous nephrostomies (NPC), one renal cyst puncture-aspiration-sclerotherapy, 102 prostate biopsies, 5 drainages by transrectal aspiration of prostatic abscesses, 10 placements of cystostomy probes. Suprapubic, 2 puncture-aspiration-sclerotherapies for vaginal hydroceles. The average age of our patients was 69 years and the predominant age range was 61 - 70. The majority of our patients were male (97.61%) with a sex ratio of 41 men to one woman. Ultrasound-guided urological interventions were for diagnostic purposes (80.95%), for therapeutic purposes (15.77%) and for diagnostic and therapeutic purposes (3.96%). The indications for ultrasound-guided urological interventions were dominated by prostate pathologies (84.91%). The majority of interventions were performed rectally (84.92%) versus (13.43%) abdominally and only 1.58% scrotally. All procedures were performed in B-ultrasound mode under local anesthesia and on an outpatient basis. For therapeutic interventions, the patients were seen again one month after the procedure, the clinical examination and ultrasound control found the evolution to be favorable. **Conclusion:** ultrasound is useful in urological practice for guiding minimally invasive in-

terventions. The indications for ultrasound-guided procedures in urology are dominated by prostate pathologies. These procedures are safe and effective with fewer complications. Interventional ultrasound must be further integrated into the habits of urologists.

## **Keywords**

Biopsy, Ultrasound-Guided, Interventions, Minimally Invasive, Nephrostomy

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## **1. Introduction**

In urological practice, ultrasound retains an important place in guiding minimally invasive interventions [1].

Ultrasound has been shown to provide safety and effectiveness by providing real-time imaging that is superior to blind approaches [2].

Ultrasound is useful for biopsies, cyst aspiration, nephrostomy, placement of a suprapubic probe and can even be used for tumor ablations [3].

Interventions guided by ultrasound offer the advantage of being safe, rapid, without radiation, less damaging and feasible under local anesthesia or simple sedation with less morbidity. These interventions can be for diagnostic and/or therapeutic purposes [4].

Unlike open surgery, image guidance allows targeting the pathology of interest while avoiding injury to adjacent normal tissues [3].

Although there are currently new imaging techniques for guiding minimally invasive interventions such as MRI and CT, ultrasound remains the most accessible, the least expensive and the easiest to use for the urologist in our context [5].

This work aimed to study the technical aspects, indications and results of minimally invasive urological interventions guided by ultrasound.

## **2. Material and Methods**

This was a prospective, descriptive study lasting one year from January to December 2023.

The data collection sheet, hospitalization files, hospitalization and operative report registers of the patients served as study material.

The study targeted all patients who consulted the service during the study period.

The study focused on all patients presenting with a pathology requiring ultrasound-guided urological intervention.

All patients who agreed to participate in the study, in whom a minimally invasive urological procedure using ultrasound guidance had been performed and who had proper medical follow-up (revisited at least once during the 4 weeks after the procedure) were included in the study.

All the procedures were carried out by the authors' team, the sociodemographic and clinical variables were obtained by questioning and examining the

patients, the technical variables and the evaluation of the results were standardized by the application of the protocol established for each procedure.

For the guidance of the gestures, we used a **General Electric Logiq A5 type ultrasound machine** with a 3.5 MHz frequency probe for interventions on the kidney and bladder, and an endocavitary probe with a 6.5 MHz frequency for interventions on the prostate. And a high-frequency 18 Hz linear probe for interventions on the scrotum.

We carried out an exhaustive recruitment, patients who met our inclusion criteria represented our sample size.

The study variables were frequency, age, sex, pathology group that indicated the intervention, purpose of the intervention (diagnostic and/or therapeutic), pathology that indicated the intervention, type of ultrasound-guided intervention, type of anesthesia, incidents during the procedure, approach, results of the interventions, complications of the interventions.

For local anesthesia, we used injectable lidocaine 2%.

To perform percutaneous nephrotomies (NPC), we used CH 10 and 12 pigtail nephrostomy probes with multi-perforated tips.

For sclerotherapy, we used 10% povidone-iodine as a sclerosing agent at the rate of 1 cc for each 100 ml of liquid aspirated.

For prostate biopsies, we took sextant samples with two cores for each area of the prostate, *i.e.* 12 cores in total.

For the placement of suprapubic cystostomy probes, we used the so-called technique (percutaneous cystostomy with Kelly forceps [6]).

*EPI-info version 7.0* database, previously established in accordance with the objectives of the study.

Our data were analyzed by *Epi-Info software version 7.0*, entered and presented by software from *Office Pack 2016*.

Informed consent was obtained from patients and data were collected under the principle of anonymity and confidentiality.

The main limitation of the study was the low volume of some ultrasound-guided procedures.

### 3. Results

The average age of our patients was 69 years and the predominant age range was 61 - 70.

The majority of our patients were male, *i.e.* 97.61% with a sex ratio of 41 men to one woman (**Table 1**).

Interventions were for diagnostic purposes in 80.95% of cases, for therapeutic purposes in 15.77% of cases and for diagnostic and therapeutic purposes in 3.96% of cases (**Figure 1**).

The indications for ultrasound-guided urological interventions were dominated by prostate pathologies, *i.e.* 84.91% (**Table 2**).

In one year, we carried out 126 ultrasound-guided urological interventions including 6 percutaneous nephrostomies (NPC), puncture-aspiration-sclerotherapy

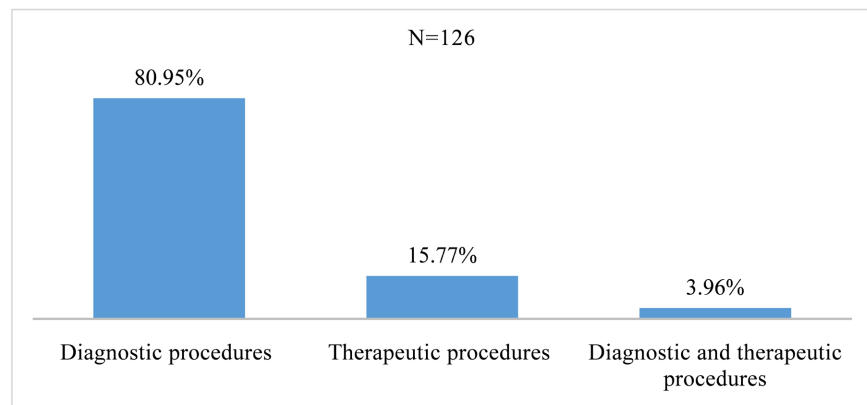
of renal cyst, 102 prostate biopsies, 5 drainages by transrectal aspiration of prostatic abscesses, 10 placements of supracystostomy probes. pubic, 2 puncture-aspiration-sclerotherapies for vaginal hydrocele (**Table 3**).

The majority of procedures were performed rectally, *i.e.* 84.92% compared to 13.43% abdominally and only 1.58% scrotally (**Figure 2**).

All procedures were performed in B ultrasound mode under local anesthesia and on an outpatient basis.

**Table 1.** Socio-demographic characteristics.

EFFECTIVE		
AGE (YEAR)	PERCENTAGE (%)	
41 - 50	4	3.17
51 - 60	10	7.93
61 - 70	74	58.73
71 - 80	32	25.39
81 - 90	7	5.5
GENDER		
Female	3	2.39
Male	123	97.61



**Diagnostic interventions:** prostate biopsy; **Therapeutic interventions:** NPC, renal cyst sclerotherapy, cystostomy, hydrocele sclerotherapy; **Diagnostic and therapeutic interventions:** Drainage of prostatic abscess.

**Figure 1.** Purpose of ultrasound-guided urological procedures.

**Table 2.** Types of ultrasound-guided urological procedures.

	EFFECTIF	PERCENTAGE (%)
<b>Echoguid gestures on the kidney</b>		
N Percutaneous nephrostomy	6	4.76
Renal cyst sclerotherapy	1	1.58
<b>Echoguid gestures on the bladder</b>		
Installation of cystostomy probe	10	7.93

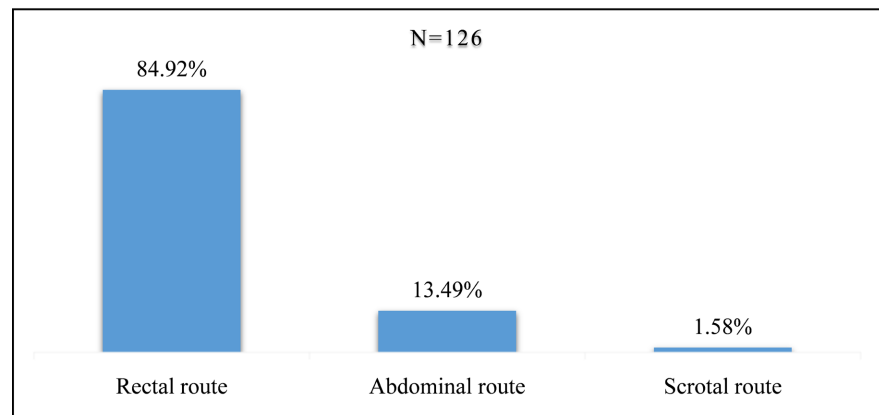
## Continued

**Echoguid gestures on prostate**

Prostate biopsy	102	80.95
Prostatic abscess drainage	5	3.96

**Echoguid gestures on the scrotum**

Hydcele sclerotherapy	2	1.58
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**Rectal route:** prostate biopsy, drainage of prostate abscess; **Abdominal route:** NPC, Renal cyst sclerotherapy, Cystostomy tube placement; **Scrotal route:** hydrocele sclerotherapy.

**Figure 2.** Initial routes for ultrasound-guided urological interventions.

**Table 3.** Indications for ultrasound-guided urological interventions.

	EFFECTIVS PERCENTAGE (%)	
<b>PERCUTANEOUS NEPHROSTOMY</b>		
Right pyonephrosis	2	1.58
Right AJPU with destroyed kidney	1	0.79
AJPU Left with kidney destroyed	1	0.79
Bilateral UHN by accidental ligation of the ureters	1	0.79
UHN Right secondary to a bladder tumor	1	0.79
<b>RENAL CYST SCLEROTHERAPY</b>		
Painful cyst, unique Bosniak I of the lower pole of the right kidney of 50 × 50 mm	1	0.79
<b>CYSTOSTOMY PROBE INSTALLATION</b>		
Rcuv in obese patient	5	3.96
Rcuv on supubic scar	5	3.96
<b>PROSTATIC BIOPSY</b>		
High PSA ≥ 4 ng/ml	18	14.28
Rectal examination suggestive of CaP	84	66.66
<b>DRAINAGE OF PROSTATIC ABSCES</b>		
Prostatic abscess of the right lobe	4	3.17
Left lobe prostatic abscess	1	0.79

**Continued****HYDROCELE SCLEROTHERAPY**

Right hydrocele of medium abundance in elderly patients with comorbidity

2

1.58

**AJPU:** Anomaly of the Pyelo-Ureteral Junction; **UHN:** Ureterohydronephrosis.

➤ **The interventional consequences of the procedures**

- Percutaneous nephrostomies were performed without incident.

NPC helped ensure adequate drainage of the kidneys, treat infection, and improve kidney function. All this made it possible to consider etiological treatment or surgical removal of the destroyed kidney under better conditions.

We witnessed a nephrostomy tube fall on day 20. The probe was successfully replaced under ultrasound guidance.

- The puncture-aspiration-sclerotherapy allowed us to empty the cyst by aspiration of 100 cc of clear liquid and to inject 1cc of sclerosing product (povidone-iodine 10%) into the cyst without intraoperative incidents. The patient was seen again one month after the procedure and the disappearance of the cyst was noted on the ultrasound control.
- The placement of the cystostomy probe made it possible to drain the urine from the bladder, providing relief to the patients, it was carried out without incident and the intravesical position of the probe and the balloon was verified by ultrasound.
- Following the prostate biopsy, two patients presented with complete retention of bladder urine (RCUV) and were treated by urethral evacuator catheterization. Histological analysis of prostate biopsy cores revealed prostate cancer (PCa) in 94 cases, *i.e.* a detection rate of 92.15%, and adenomatous hyperplasia of the prostate in 8 cases.
- Transrectal drainage of prostatic abscess brought back whitish pus in 4 cases and greenish pus in one case. Cytobacteriological analysis of the pus isolated *Staphylococcus aureus* in 4 cases and *Escherichia coli* in one case. This made it possible to correct the infection in accordance with the antibiogram. The control endorectal ultrasound one month after drainage noted the disappearance of the lesions.
- The puncture-aspiration-sclerotherapy of the right hydrocele of medium abundance allowed us to evacuate citrine yellow liquid 150 cc in one patient and 130 cc in the other.

1.5 cc of sclerosing agent (povidone iodine 10%) had been instilled vaginally in both patients.

The 1-month and 3-month ultrasound check did not find any residual hydrocele.

## 4. Discussion

We studied the technical aspects, indications and results of minimally invasive

ultrasound-guided urological interventions during the year 2023.

The low volume of ultrasound-guided interventions was the main limitation of our study.

This fact could be explained by the multiplicity of alternative means to minimally invasive ultrasound-guided interventions.

○ **Age and sex**

The majority of ultrasound-guided urological procedures were performed in elderly male subjects.

The average age of our patients was 69 years and the predominant age range was 61 - 70.

The male sex represented 97.61% with a sex ratio of 41 men to one woman.

This is easily understood if we know that the prostate pathologies which occupy the first place among the indications for ultrasound-guided interventions are specific to men of advanced age.

Kabass *et al.* [7] in a study of ultrasound-guided transrectal prostate biopsies reported a mean age of 63.18 years.

Aguilera *et al.* [8] in a study on ultrasound-guided cystostomies found that all patients were male with a median age of 60.7 years.

○ **Percutaneous nephrostomy**

It represented 4.76% (n = 6) of interventions, it was bilateral in a single case, unilateral right in 4 cases and left in one case and its indications were pyonephrosis (n = 2), AJPU with destroyed kidney (n = 2), Bilateral UHN by accidental ligation of the ureters (n = 1) and Right UHN secondary to a bladder tumor (n = 1).

Bah OR *et al.* [9] reported 12 cases of ultrasound-guided PCN performed in 7 years, indicated in the presence of 2 cases of acute obstructive pyelonephritis, 4 cases of obstructive renal failure and 6 cases of giant hydronephrosis.

The development of endourology in recent years has reduced the indications for percutaneous nephrostomy [10].

Ultrasound guidance of the PCN occupies an increasingly important place compared to fluoroscopic guidance [10].

Although ultrasound-guided PCN is considered the gold standard for percutaneous treatment, it has considerable limitations in patients with anatomical obstacles such as retrorenal colon, obesity, or non-or minimally dilated kidneys [11].

A percutaneous nephrostomy can be performed under ultrasound guidance with a success rate ranging from 83.1% to 92% [12] [13].

The most common emergency indication for PCN is drainage of an acutely infected and obstructed kidney (pyonephrosis or obstructive pyelonephritis) in a septic patient due to the high mortality risk as well as renal failure. permanent that this can cause [13].

In these cases, percutaneous nephrostomy and double J retrograde ureteral stent are recommended. The decision to choose which is preferred is usually determined by local technical expertise, equipment availability, and individual patient factors. PCN is often preferred in the most critically ill patients due to its

reduced handling, obstructed and infected ureter [13] [14].

The major complication rate of ultrasound-guided NPC is 4 to 5%. Major hemorrhage and septic shock are the most serious complications [13] [15].

We did not note any complications during our study.

Ultrasound-guided PCN, performed only by a urologist, is a safe, reproducible and effective procedure, regardless of the experience of the operator [16] [17].

- **Renal cyst puncture-aspiration-sclerotherapy**

Simple kidney cysts are mostly asymptomatic but some can cause symptoms, the most common of which is lower back pain [18].

In our study it was a painful, unique cyst classified Bosniak I of the lower pole of the right kidney measuring 50 × 50 mm.

Symptomatic Bosniak I and II renal cysts can be treated by various surgical and percutaneous methods, including percutaneous aspiration (with or without sclerosing agent), percutaneous marsupialization, and resection of the protruding dome by open or laparoscopic approach [19] [20].

Brown D *et al.* [21] in a meta-analysis of 57 studies published in 2021 found that ultrasound was the predominant modality for image guidance for cyst aspiration and sclerotherapy administration, used in all but five studies (5) who used CT scanning.

Although resection of the protruding dome of the cyst is more effective than sclerotherapy aspiration in terms of recurrence, it remains more invasive with a higher anesthetic risk [21].

There is no consensus on the type of sclerosing agent to use, especially since there is a diversity of them, the best studied of which are povidone-iodine, ethanol, polidocanol, acetic acid and none agent showed no established superiority over others [20] [22].

In our study, we used povidone iodine 10%.

El harech *et al.* [23] reported, using povidone-iodine as a sclerosing agent, a complete clinical regression of 92% with total disappearance of the cyst on ultrasound in 60% of cases.

Povidone-iodine sclerotherapy is a simple, effective and reproducible technique in the treatment of symptomatic simple kidney cysts.

The decision as to which sclerosing agent to use should be based on its physicochemical characteristics, patient comorbidities, cyst location and surgeon experience [19] [21] [22].

- **Placement of suprapubic cystostomy tube**

Cystostomy tube placement is a common bladder urine drainage procedure [24].

The suprapubic catheter (SPC) should only be placed in patients with a bladder globe in cases where the placement of a urethral catheter is either impossible for mechanical reasons (fracture of the pelvis) or pathological reasons (stricture of the urethra), is contraindicated (urethral trauma) [24].

Although a safe procedure, CSP is sometimes fraught with complications, the most serious of which are perforations of intestinal loops [25].

There were no complications in our patients.

Ahluwalia *et al.* [25] audited their experience with blind suprapubic catheterization and reported a 2.5% risk of intestinal lesions and 1.8% mortality.

According to the British Association of Urological Surgeons, practice guidelines for suprapubic catheters [26] blind insertion should not be undertaken in patients with a history of lower abdominal surgery, obesity or inadequate chest distention the bladder preventing easy palpation of the bladder globe.

Open or cystoscopy-guided surgical insertions are methods CSP insertion alternatives. However, cystoscopic guidance does not completely exclude intestinal injury. Open surgical insertions of CPS require general anesthesia and have higher morbidity [27].

In such circumstances, ultrasound should be used to identify the distended bladder and ensure that a suction needle on the intended catheter path enters the bladder at an appropriate point on the anterior bladder wall [26].

Ultrasound can also be used to determine if there is bowel interposed in the intended path of the catheter into the bladder [28].

History of lower abdominal surgeries and obesity with difficulty palpating the bladder globe were the indications for ultrasound guidance in our patients.

Imaging alternatives to ultrasound guidance are CT guidance, MRI, and fluoroscopy [29] [30]. CT and MRI provide the greatest degree of certainty about the position of the intestine [27] [29].

But are limited by radiation, cost and accessibility, especially in our context.

There are several suprapubic bladder diversion techniques, the most described of which are the Seldinger technique, the trocar technique (cystocath) [30] and Kelly forceps cystostomy [6].

We performed all cystostomy probe placements using Kelly forceps because of its greater technical ease and it requires few resources, especially in our context.

#### ○ **Prostate biopsy**

They represented the most performed procedure in our study and it was ultrasound-guided transrectal prostate biopsy.

Histological analysis of prostate biopsy cores confirms the diagnosis of prostate cancer [31] [32].

Biopsy is indicated in cases of abnormal digital rectal examination and/or elevated PSA level [33].

In our study, PSA elevation and digital rectal examination suggestive of CaP were the indications for biopsy in 18 and 84 cases, respectively.

Performing prostate biopsies is a painful procedure [34].

We performed local anesthesia by periprostatic infiltration of 2% lidocaine in all our patients.

Local anesthesia based on lidocaine 1 to 2% is recommended to improve the tolerability of the examination. Performing a periprostatic block using an ultrasound-guided endorectal route with a 22 G needle is the technique of choice. Intra-rectal instillation of anesthetic gel is less effective than periprostatic block [31] [35].

General or locoregional anesthesia can be performed in certain special cases (intolerance or allergy to local anesthesia) representing less than 10% of procedures [36].

Ndiaye *et al.* [37] used 10 ml of 20% xylocaine urethral gel 10 min before prostate biopsy.

The alternative approach to ultrasound-guided transrectal biopsy is ultrasound-guided transperineal biopsy.

Transperineal and transrectal prostate biopsies have the same diagnostic accuracy [38] [39].

The transperineal route has shown its interest in reducing the risk of post-biopsy infection but is limited by technical difficulties and post-biopsy pain [36] [38] [39].

We performed systematic sextant biopsies with the collection of 12 cores in all our patients.

The Korean Society of Radiology and AFU guidelines for ultrasound-guided transrectal prostate biopsy recommend the 12-core routine biopsy regimen [35] [36].

Saturation biopsies are not recommended because it does not improve the detection rate but increase the risk of complications [36].

In case of positive MRI, defined by a PI-RADS score  $\geq 3$ , targeted biopsies (minimum 3 - 4) are associated with systematic biopsies [31] [36].

We did not perform a targeted biopsy in our patients because MRI is an examination that is not easily accessible in our context.

Prostate biopsy guided by magnetic resonance imaging (MRI) has a higher sensitivity than ultrasound-guided biopsy, but its performance requires interventional MRI, specific equipment, which is not available in our context [36] [37].

Ultrasound-guided biopsy therefore remains of great interest.

Hemospermia and hematuria represent the most common complications of prostate biopsies. The risk of acute urinary bladder retention can be as high as 10%. Infectious complications (prostatitis) are the most serious and represent 3 to 5% [36] [39].

We observed two cases of postbiopsy RCUV treated by evacuator urethral catheterization.

Ndiaye *et al.* [37] reported 6.9% complications with a predominance of initial hematuria, micturition pain and fever.

In our study, the histological analysis of prostate biopsy cores made it possible to diagnose 94 cases (92.15%) of prostate cancer.

Ndiaye *et al.* [37] and kabass *et al.* [7] found respectively histology showed 53.7% and 45.16% prostate adenocarcinomas.

The high detection rate in our study would be related to the number of cases of prostate cancer manifested at TR, *i.e.* 84 out of 102 cases.

The detection rates of ultrasound-guided prostate biopsy are significantly higher than digital-guided biopsies [36].

- **Puncture-Aspiration of prostate abscess**

The diagnostic method of choice, which also serves as a treatment and monitoring tool for patients with a prostatic abscess, is transrectal ultrasound of the prostate. It specifies the site, volume and number of lesions allowing a better therapeutic indication [40] [41].

Treatment of prostate abscess is based on antibiotic therapy and/or drainage of the abscess [42].

Medical management alone with prolonged administration of antibiotics has often been administered successfully in cases of prostatic abscesses less than 2 cm in size [43].

There is no consensus on the methods of drainage of the prostate abscess, especially since there are a variety of means [40] [43].

Drainage can be performed by transrectal or transperineal puncture guided by imaging (ultrasound, computed tomography, magnetic resonance imaging), by transurethral incision or resection of the prostate, or open perineal or transvesical drainage [44].

Recent studies suggest that less invasive treatment by ultrasound-guided percutaneous or transrectal drainage is preferred over other methods because it can be performed under local anesthesia and repeated if necessary [44] [45].

In our study, we performed ultrasound-guided transrectal aspiration drainage of the prostatic abscess.

Less invasive methods also have a lower risk of complications, particularly possible retrograde ejaculation which occurs after transurethral incision or resection in young patients [45].

Drainage by resection or transurethral incision should be reserved for cases of multiple, diffuse prostatic abscesses or when aspiration does not show complete resolution of the fluid collection and in elderly patients with prostatic obstruction [42].

In our study, cytobacteriological analysis of pus isolated *Staphylococcus aureus* in 4 cases and *Escherichia coli* in one case. This made it possible to correct the infection in accordance with the antibiogram.

The bacteriology of prostatic abscesses is identical to that of acute prostatitis [46].

Prostatic abscesses result from focal accumulation of pus in the prostate, historically caused by *Neisseria gonorrhoea*, *Staphylococcus aureus*, and *Mycobacterium tuberculosis*. However, more recently, Gram-negative bacteria, such as *Escherichia coli*, are increasingly found [40] [41].

The control endorectal ultrasound one month after drainage noted the disappearance of the lesions in all our patients.

#### ○ **Puncture-Aspiration-Sclerotherapy of vaginal hydrocele**

Surgery is the standard treatment for hydrocele; its indication is for functional disorders. The two main techniques are Lord's plication and vaginal resection. There are two other techniques, with limited indications, fenestration which brings the vaginal area into contact with the subcutaneous cellular tissue rich in

lymphatics and puncture–injection of sclerosing product [47].

The hydrocele puncture can be followed by an intravaginal injection of sclerosing product. The success rate in the literature varies from 33 to 84%, significantly lower than surgical treatments [48].

Shakia B *et al.* [49] in a meta-analysis in 2023 comparing aspiration-sclerotherapy and conventional hydrocele treatment reported that there was no significant difference in clinical cure. The meta-analysis revealed a significant increase in recurrences in the sclerotherapy group compared to the surgical group.

Aspiration-sclerotherapy is recommended for patients with high surgical and anesthetic risk or avoiding surgical intervention [47] [50].

Our patients were elderly with comorbidities.

Blind sclerotherapy aspiration is dangerous with risks of epidimo-testicular lesions by the puncture needle, it must be guided by ultrasound which makes it possible to direct the needle but also to identify the position of the testicle thus avoiding needlestick injuries [1].

The sclerosing agents are numerous and of diverse nature, the most studied are tetracycline, povidone-iodine, alcohol, antazoline, rifampicin, sodium tetracycl sulfate [49]-[51].

Tetracyclines are the most used but they cause pain [47] [51].

In our study, povidone-iodine 10% was the sclerosing agent.

Postoperative complications are greater for hydrocelectomy (hematoma 77.8% vs 8.8% after aspiration) [48].

Although aspiration and sclerotherapy have fewer complications, morbidity, and are less expensive, they have a lower success rate and lower patient satisfaction than hydrocelectomy [49] [52].

## 5. Conclusions

Ultrasound is useful in urological practice for guiding minimally invasive interventions. The indications for minimally invasive ultrasound-guided interventions in urology are dominated by prostate pathologies. Percutaneous nephrostomies (PCN), renal cyst aspiration-sclerotherapy, prostate biopsies, transrectal aspiration drainage of prostatic abscesses, suprapubic cystostomy probe placements, hydrocele aspiration-sclerotherapy vaginal are minimally invasive ultrasound-guided procedures in our context. These procedures are safe and effective with fewer complications

We must further integrate interventional ultrasound into the habits of urologists.

## Conflicts of Interest

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

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