



Bladder Stones as an Etiological Factor that Must Be Kept in Mind Due to Their Increased Incidence in Female Patients with Lower Urinary Tract Complaints

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ABSTRACT

Objective: Bladder stones make up 5% of urinary tract stone diseases, and 5% of all bladder stones are seen in women. All kinds of pathologies, chronic urinary tract infections, and foreign bodies causing urinary flow to be dysfunctional are regarded as predisposing factors in general. Well-defined endoscopic, laparoscopic, and open surgical procedures can be performed for treatment. In this study, we retrospectively examined data from female patients who were operated after being diagnosed with bladder stones in our clinic.

Methods: Data from 92 females who were operated after being diagnosed with bladder stones at our clinic between January 2006 and October 2014 were retrospectively analyzed. The patients' demographic information, complaints on admission, etiological factors in stone formation, and pre-/post-operative data were retrospectively analyzed.

Results: The ages of the patients ranged between 17 and 85 years (mean, 46.8 years). When the backgrounds of the patients were studied, a history of the following was found: gynecological procedures in 49 patients [12 patients with transobturator tape (TOT), trans-vaginal tape in 10 (TVT), trans-abdominal hysterectomy and bilateral salpingo-oophorectomy in 9 (TAH-BSO), cystocele repair in 7, cesarean section in 8 (C/S), intrauterine device migration in 3, and neurogenic bladder dysfunction in 9]. The average stone size was 25.4 mm (range, 7-50 mm). Except for 9 patients with an excess load of stones or in whom the stones could not be previously removed using endoscopic methods, all patients were endoscopically treated.

Conclusion: Together with a more frequent application of urogynecological procedures, bladder stones in females have become an important fact in clinical practice that should not be ignored. Therefore, despite the safe and successful use of endoscopic surgical procedures, this topic needs to be supported and developed with new studies.

Keywords: Lithotripsy, bladder stones, neurogenic dysfunction, intrauterine devices, cystocele, sling

INTRODUCTION

Bladder stones comprise 5% of urinary stone diseases in developed countries (1). Five percent of all bladder stones are seen in women, and the most frequent causes are foreign bodies (sutures, synthetic tape, and mesh) and bladder outlet obstruction (2). Chronic urinary tract infections, anatomic disorders, neurogenic voiding dysfunctions, and metabolic diseases are other predisposing factors (3). Bladder stones may be seen in children due to nutritional deficiencies based on particularly low protein diets (1). In recent years, as a result of maintaining infection control with the change in diet habits and development of antibiotics, the incidence of bladder stones has been considerably decreasing.

As patients may be asymptomatic, they often present with complaints of irritative symptoms, such as dysuria and pollakiuria or hematuria. While a prediagnosis may be made radiologically using various methods, the final diagnosis is made using cystoscopy. In addition to well-defined endoscopic treatments, extracorporeal shock wave lithotripsy (ESWL), percutaneous surgeries, open or laparoscopic cystolithotomy, and surgeries performed as combinations of these are applied in selected cases.

In this study, we retrospectively examined the etiological factors and treatment methods of female patients diagnosed with bladder stones in our clinic in a broad perspective.

METHODS

After obtaining ethics committee approval, data from 92 female patients who were operated on with a diagnosis of bladder stones in Bakırköy Dr. Sadi Konuk Training and Research Hospital Urology Clinics between January 2006 and October 2014 were retrospectively examined. The diagnosis of bladder stones was made using various diagnostic methods, such as direct urinary system graph (DUSG), urinary system ultrasonography (USU), whole abdomen computed tomography (CT), and/or diagnostic cystoscopy. Mechanical, ultrasonic, pneumatic, and holmium: YAG laser lithotripsy were performed in patients in whom a decision to perform endoscopic surgery was made. It was reached to the bladder by suprapubic incision in open surgeries. The patients' demographic information, application complaints, etiological factors of stone formation, and pre-/postoperative information were retrospectively examined. Written informed consent was obtained from patients who participated in this study.

RESULTS

The ages of the patients operated due to the presence of bladder stones ranged between 17 and 85 years (mean: 46.8 years). Although most patients presented with the complaint of dysuria, hematuria, pollakiuria, and recurrent urinary tract infections were among the other complaints. Routine diagnostic methods, such as DUSG, USU, and CT when necessary, were used in the



investigation phase. When medical histories of the patients were examined, 49 patients had a history of gynecologic intervention [transobturator tape (TOT) in 12 patients, transvaginal tape (TVT) in 10, transabdominal hysterectomy and bilateral salpingo-oophorectomy in 9, cystocele repair in 7, cesarean section in 8, and intrauterine device migration in 3] and 9 had neurogenic bladder dysfunction (Figure 1). The mean stone size was 25.4 mm (range, 7–50 mm). All, but 9 who had excessive stone burden or whose stones could not be removed by endoscopic methods previously, patients were treated endoscopically. Open surgery was performed in 3 patients in whom calcification due to the presence of a foreign body was observed after the failure of endoscopic methods. After endoscopic surgery, postoperative fever due to urinary tract infection was detected in 2 patients and these patients were treated conservatively with appropriate antibiotics. One patient who underwent open surgery due to hemorrhage in the early postoperative stage required transfusion.

DISCUSSION

Bladder stones may form secondarily in anatomical abnormalities in which drainage is impaired or in neurological diseases spoiling detrusor activity and in chronic infections in the presence of an intravesical foreign body or passing stone spontaneously from the upper urinary tract (4, 5).

The presence of an adynamic region in the bladder as a result of anatomical disorders and neurological diseases or detrusor sphincter dyssynergia are risk factors for the formation of residual bladder stones due to the lack of total drainage of the bladder (5, 6). The risk of bladder stone formation was observed in 4% of patients with neurogenic bladder dysfunction associated with spinal cord injury and having a permanent catheter and in 0.2% of patients in whom intermittent catheterization was required (6). Devivo et al. (7) detected that bladder stones formed in 36% of patients having spinal cord injury and who were followed for 8 years. Nine paraplegic patients with catheters who were in the study had histories of endoscopic stones, and mostly, *Escherichia coli* growth was detected in their preoperative urinary cultures. Otnes suggested that bladder stones are associated with urinary tract infections in 22–34% of patients and that the most frequently isolated microorganism was *Proteus* spp. (8) Microorganisms that form urea, such as *Proteus*, *Klebsiella*, *Serratia*, and *Enterobacter*, may cause struvite stone (magnesium ammonium phosphate) formation by alkalinizing urine and aggregation with preformed nidus supersaturation (9).

The most frequent factor in the formation of bladder stones is the presence of foreign body acting as nidus. Foreign bodies, surgical suture materials used during surgical repair of pelvic organ prolapses, and forgotten bandages (Gossipoma) may occur after unnoticed bladder perforations during incontinence surgeries, such as TVT and TOT or migration of intrauterine devices into the bladder (10). Seven patients included in the study had urinary tract stone history and an encrusted JJ catheter, which migrated from the upper urinary tract or inserted after stone surgery in their etiologies (Figure 2).

After proliferation of intrauterine devices as a contraception method, a rise in the number of women with bladder stones was detected (11), and it was determined that the perforation rates

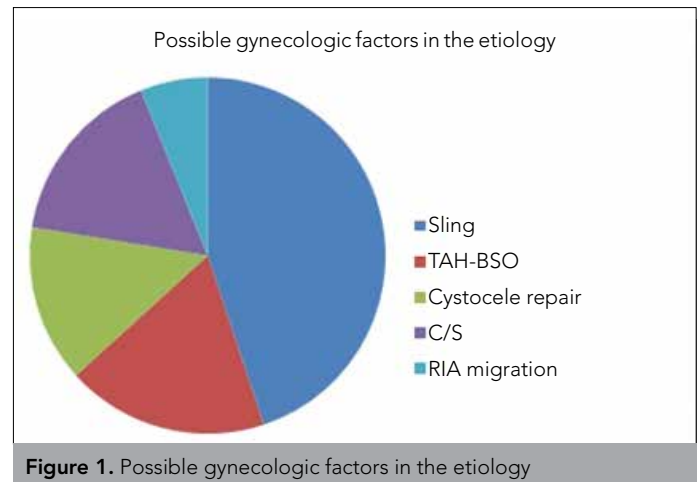


Figure 1. Possible gynecologic factors in the etiology

during insertion of devices was 0.87 in every 1000 cases (12). Kassab and Audra (13) determined migration into the bladder in 23 (14%) of 165 patients having intrauterine device migration that they examined retrospectively.

Not conducting cystoscopy intraoperatively particularly during TVT and TOT operations and not noticing these kinds of perforations and also failures experienced in follow-up of these patients lead to delays in diagnosis and cause medicolegal problems concomitantly. Another issue that should be considered regarding bladder stones although there are opposing studies, is squamous cell carcinoma secondary to dysplasia developing on the basis of chronic inflammation in patients not being able to receive treatment for a long time (14).

Patients with bladder stones usually tend to present with massive hematuria and irritative symptoms, and incontinence, urgent urination feeling, pollakiuria, terminal hematuria, and recurrent urinary tract infections are other symptoms that can be seen (15). Although DUSG, USU, and, when necessary, CT surveys provide more detailed information in patients suspected of having bladder stones in diagnosing nonopaque and opaque stones, the final diagnosis of bladder stones is established through cystoscopy and it provides treatment opportunity in the same session (16).

In the process of treatment of bladder stones, the symptoms should be first brought under control and appropriate antibiotic therapy should be carried out in the presence of urinary infection. The condition of patient, etiological factors, stone burden, and localization should be considered and a suitable intervention should be planned. Although provision of urine alkalization with sodium bicarbonate or potassium citrate as a medical treatment option is effective in uric acid and cystine stones, basic treatment of bladder stones is to not leave any stone behind (17).

Although ESWL success rates in various studies were between 75 and 100%, Torricelli et al. (18) recommended performing ESWL in select patients who had small bladder stones and at a high surgical risk as they had lower success rates. Mechanical, ultrasonic, electrohydraulic, manual, and holmium: YAG laser lithotripsy were described during endoscopic surgeries. An increase in the treatment of bladder stones using endoscopic methods with developing laser technologies has been observed. Un-in et al. (19) compared laser and pneumatic lithotripsy and detected that

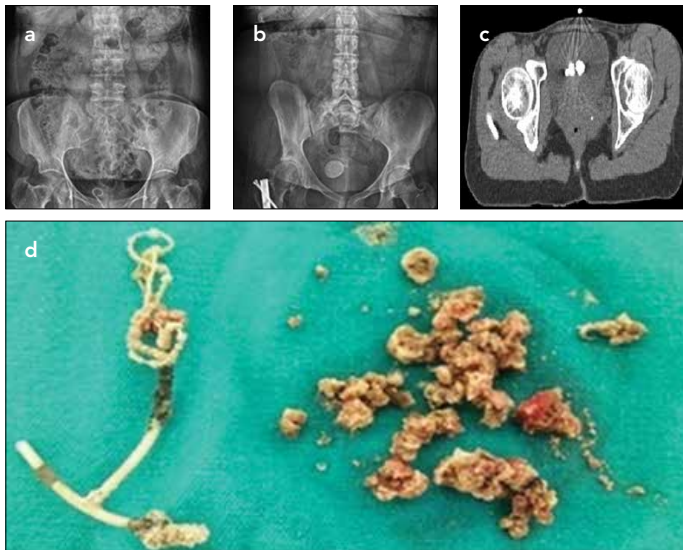


Figure 2. a-d. Views of patients. (a) Graphy of an encrusted JJ catheter; (b) a bladder stone found in a paraplegic patient; (c) CT image of suture material calcified after cystocele repair; (d) postoperative view of RIA that migrated to the bladder and was calcified.

although both methods were effective, laser lithotripsy provided fragmentation in a shorter time and was more effective (19). Endoscopic lithotripsy was performed in 83 of 92 patients included in our study, and mechanical, ultrasonic, pneumatic, and laser lithotripsy were used as lithotripter.

In order of frequency, urinary tract infections, fever, bladder perforation, hyponatremia, and hemorrhage have been indicated as complications that may occur after endoscopic surgery (20, 21). Postoperative fever was observed in 2 patients in our present study and was treated using endoscopic methods.

Ikari et al. (22) suggested that success rates using percutaneous methods that they developed for treating large bladder stones were 85–100%. However, percutaneous methods have been contraindicated for patients who have a history of bladder tumors, artificial sphincters, active infections in the urinary tract or abdominal wall, and previous abdominopelvic surgery, who have received radiotherapy, and in whom a mesh has been used due to hernia repair (23).

Open surgery is recommended in the presence of simultaneous diverticulum, unsuccessful endoscopic intervention, an abnormal anatomy preventing percutaneous intervention, and excessive stone burden (24). In our study, open surgery was performed for 9 patients having excessive stone burden and a history of unsuccessful endoscopic intervention. In 1 of these patients, there was a necessity for erythrocyte transfusion in the postoperative phase because of bleeding, and the patient was followed conservatively after transfusion.

DeLair et al. (25), in the surgical technique that they modified endoscopic and open method, removed the foreign body from the suprapubic incision cut-to-the-light after detection of a foreign body through cystoscopy. Torricelli et al. (18) suggested that percutaneous methods have the lowest rates of morbidity and that their success rates are similar to those of endoscopic methods. Additionally, they suggested that ESWL has the lowest success

rate and that it had to be applied for select high-risk patients in surgeries performed for stones smaller than 2 cm. Shin et al. (26) removed the intrauterine device that migrated into the bladder by laparoscopy; they suggested that this method was much more minimally invasive than open surgery.

In our study, foreign bodies calcified in the bladder after incontinence surgery in 3 patients and no stones were left by performing open surgery on not being able to remove these foreign bodies by pneumatic and laser lithotripsy.

Partial cystectomy may rarely be needed as rescue therapy in case all these methods fail and the foreign body cannot be removed (27).

CONCLUSION

The occurrence of bladder stones in females has become important in our clinical practice. They should not be overlooked. With the more frequent use of urogynecological applications in a wide framework, including the use of synthetic material as well, which may be associated with medicolegal problems. Although endoscopic surgeries at the forefront are safely and successfully used, support and development of this issue with new studies are necessary.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Bakırköy Dr. Sadi Konuk Training and Research Hospital.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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