Marijana Jandrić-Kočić[1], Snežana Knežević[2]

DIVERTIKULUM MOKRAĆNE BEŠIKE

Apstrakt: Divertikulum mokraćne bešike podrazumjeva hernijacije sluznice između glatkih mišićnih vlakana detruzora. Uzroci mogu biti stečeni, urođeni i jatrogeni. Uzrokuju ozbiljne komplikacije, uključujući rupturu divertikuluma i razvoj akutnog abdomena, kao i intradivertikularnu neoplazmu. Nerijetko se otkrivaju slučajno tokom radiografske procjene i proučavanja nespecifičnih simptoma ili znakova donjeg urinarnog sistema. Divertikulektomija je postupak izbora u liječenju. U ambulantu porodične medicine javio se muškarac starosti 42 godine zbog rutinskog pregleda. Bez tegoba, do sada zdrav. Ima pozitivnu porodičnu anamnezu na kardiovaskularne bolesti i karcinom. Ultrazvučnim pregledom abdomena (konveksnom sondom 3.5-5 MHz) suphepatično desno se otkriva velika septirana cistolika promjena dijametra 24x15 mm. Kompjuterizovanom tomografijom u desnoj polovini hemiabdomena, odnosno u desnom infrakoličnom prostoru, identifikuje se jasno ograničena tankozidna cistolika promjena veličine 108x99x100 mm (LLxAPxCC), koja se donjim polom spušta u karlicu. Intraoperativno se utvrdi da cistolika promjena odgovara divertikulumu mokraćne bešike. Pacijentu se učini divertikulektomija i hernioplastika po Lichtensteinu. Oporavljen, stabilnog opšteg stanja i zadovoljavajućeg hirurškog nalaza otpušta se kući sedmog postoperativnog dana. Pažljivom evaluacijom i ultrazvučnim pregledom u ambulanti porodične medicine omogućena je pravovremena dijagnoza i uspješna intervencija i spriječene ozbiljne komplikacije.

Ključne riječi: mokraćna bešika, divertikulum, opstrukcija, kongenitalni razvoj

UVOD

Divertikulum mokraćne bešike podrazumjeva hernijacije sluznice između glatkih mišićnih vlakana detruzora (1, 2, 3). Uzroci mogu biti stečeni, urođeni i jatrogeni (1–6). Stečeni divertikulumi predominantno su prisutni u muškaraca, većinom sta-

[1] Dom zdravlja Krupa na Uni

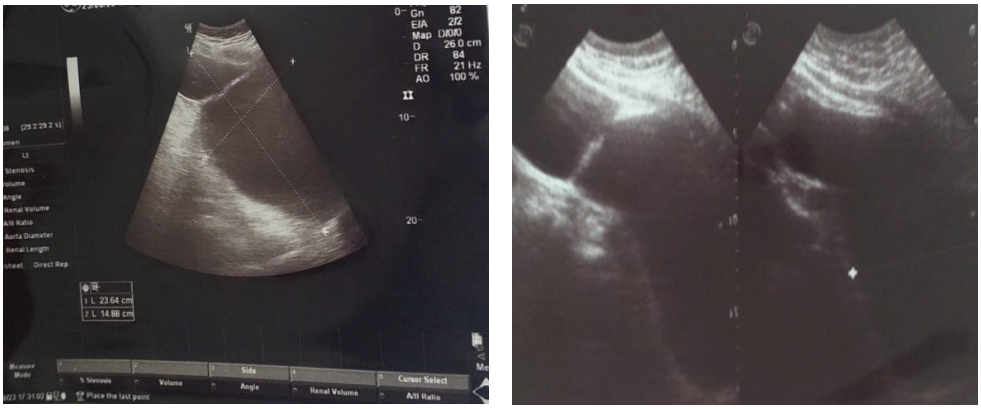
[2] Dom zdravlja Kraljevo

rije životne dobi (vrhunac incidence u uzrastu od 60 godina) (4). Utvrđeni su u 15% opstruktivnih stanja donjeg urinarnog trakta (4, 6). Manjih dimenzija, povezani sa trabekulacijom mokraćne bešike (1, 2, 5). Izrađeni su od tankog zida (bez muskularis propria), sa uskim vratom ili otvorom koji komunicira sa lumenom mokraćne bešike (4). Kongenitalni divertikulumi čine oko 2% svih divertikuluma mokraćne bešike (4). Prisutniji su u muškaraca (5:1) i povremeno povezani s drugim kongenitalnim sindromima (4). Podrazumjevaju poremećaj u razvoju mišića detrusora u odsustvu subvezikalnih prepreka (normalan intravezikalni pritisak) (5). Zid kongenitalnih divertikuluma izrađuju svi slojevi mokraćne bešike (uključujući muscularis propria) (4). Pretežno su solitarni i nerijetko većih dimenzija (1, 2).

Divertikulumi mokraćne bešike su često asimptomatični (6). Osim toga, mogu biti prisutni simptomi uzrokovani zadržavanjem urina u divertikulumu (1, 3). Nerijetko se otkrivaju slučajno tokom radiografske procjene i proučavanja nespecifičnih simptoma ili znakova donjeg urinarnog sistema (2). Divertikulektomija je postupak izbora u liječenju (2).

PRIKAZ SLUČAJA

U ambulantu porodične medicine javio se muškarac starosti 42 godine na rutinski pregled. Bez tegoba, do sada zdrav. Ima pozitivnu porodičnu anamnezu na kardiovaskularne bolesti i karcinom. Fizikalnim pregledom nalazi se uredan nalaz. Ultrazvučnim pregledom abdomena (konveksnom sondom 3.5-5 MHz) suphepatično desno se otkriva velika septirana cistolika promjena dijametra 24x15 mm (Slika 1). U laboratorijskom nalazu prisutne su povišene vrijednosti leukocita (10.5 g/L), holesterola (6.43 mmol/L) i triglicerida (4.4 mmol/L). Po preporuci abdominalnog hirurga pacijent se upućuje na kompjuterizovanu tomografiju. Istom se u desnoj polovini hemiabdomena, odnosno u desnom infrakoličnom prostoru, vidi jasno ograničena tankozidna cistolika promjena veličine 108x99x100 mm (LLxAPxCC), koja se donjim polom spušta u karlicu. Njena anterolateralna kontura je u bliskom intimnom kontaktu sa unutrašnjom konturom trbušnog zida. Cista ispoljava mas efekat, odnosno blago razmiče i komprimuje okolne vijuge tankog crijeva. Osim toga, nalazi se prosta cista dijametra 70 mm desno ekstrarenalno, cista denznog sadržaja dijametra 32 mm u donjem polu desnog bubrega i 2 do 3 ciste dijametra do 6 mm interpolarno i u donjem polu lijevog bubrega. Nakon preoperativno provedene antibiotske profilakse i profilakse duboke venske tromboze učini se operacija u opštoj endotrahealnoj anesteziji. Intraoperativno se utvrdi da cistolika promjena odgovara divertikulumu mokraćne bešike. Izvede se divertikulektomija od strane urologa, hernioplastika po Lichtensteinu od strane abdominalnog hirurga. Oporavljen, stabilnog opšteg stanja i zadovoljavajućeg hirurškog nalaza, pacijent se otpušta kući sedmog postoperativnog dana.



Slika 1. *Ultrazvuk abdomena*

DISKUSIJA

Kongenitalni divertikulumi su najčešće malformacije mokraćne bešike (6). Prvi ih je opisao Hutch 1962. godine (1). Prema Foxu, 98% kongenitalnih divertikuluma nalazi se u neposrednoj blizini orificijuma ili na trigonumu mokraćne bešike, a samo 2% polazi sa fundusa (1). Nastaju zbog defekta veze između trigonuma i preostalog dijela zida mokraćne bešike, koji imaju različito embriološko porijeklo (trigonum je mezodermalnog porekla, preostali dio zida mokraćne bešike nastaje od endoderma) (1, 6). Divertikulumi na verteksu su poreklom od urahusa (1). Postoje i posebni oblici divertikuluma mokraćne bešike, koji su posljedica intrauterine subvezikalne opstrukcije (urođena kontraktura vrata mokraćne bešike, prisustvo zadnje valvule uretre) ili poremećaja inervacije bešike (sfinkterospazam) (1). Kongenitalni divertikulumi su solitarni sa dimenzijama koje značajno variraju i mogu biti jednake ili veće od zapremine mokraćne bešike (6). Dimenzije i oblik komunikacijskog otvora između divertikuluma i mokraćne bešike su značajne, imajući u vidu da komunikacijski otvor uzrokuje otežanu divertikularnu drenažu s intradivertikularnom stazom urina (6).

S druge strane, stečeni divertikulum predstavlja renoureteralni zaštitni mehanizam od povećanog intravezikalnog pritiska uzrokovanog posteriornom uretralnom valvulom, divertikulumom prednje uretre, strukturom uretre, neurogenom disfunkcijom mokraćne bešike ili vezikosfinkterijskom disfunkcijom (6). Veoma rijetko nastaju jatrogeno (miotomija detruzora) (6). Postoji mišljenje da mogu nastati i nakon urinarne infekcije koja slabi mišić detrusora (5). Stečeni divertikulumi su multipli i obično manjih dimenzija (1).

Divertikulumi mokraćne bešike su veoma često asimptomatični (7). Međutim, zadržavanje urina u divertikulumu može uzrokovati hematuriju usljed kalkuloze,

infekciju urinarnog trakta, refluks i opstrukciju uretera, retenciju urina, rupturu divertikuluma i razvoj akutnog abdomena, displaziju, metaplaziju, leukoplakiju i intradivertikularnu neoplazmu (0,8%–10%) (1, 7, 8). Ultrazvukom se utvrđuje prisustvo divertikuluma, promjena u gornjem urinarnom traktu i subvezikalnih opstrukcija (9). Kompjuterizovanom tomografijom se određuju precizne mjere divertikuluma, bliskost zadnje površine divertikuluma i susjednih organa (rektum i homolateralni ureter) (9). Cistoskopija identifikuje dimenzije vrata divertikuluma i njegov položaj u odnosu na ureteralni meatus (9). Retrogradna uretrocistografija predstavlja metodu izbora u otkrivanju divertikula mokraćne bešike (9). Urodinamski pregled omogućava dodatne informacije koje su veoma korisne u etiološkom istraživanju (9). Diferencijalna dijagnoza obuhvata anomalije materice, jajnika i jajovoda, urahalne ciste, ektopični ureter, ureterocoele, Mullerove ciste, postoperativne promjene poput limfokele (2). U malog broja stečenih diverikuluma sa otklanjanjem opstrukcije dolazi do povlačenja divertikula (10). Najveći broj divertikuluma zahtjeva divertikulektomiju, koja se može izvesti ekstravezikalnim, intravezikalnim ili kombinovanim pristupom (9).

U prikazanom slučaju, s obzirom na položaj, veličinu i solitarnost divertikuluma, najverovatnije se radilo o kongenitalnom divertikulumu. Pravovremenom dijagnozom i uspješnom intervencijom spriječene su ozbiljne komplikacije.

ZAKLJUČAK

Divertikuli mokraćne bešike nemaju jedinstvenu prezentaciju i obično se otkrivaju slučajno. Uzrokuju ozbiljne komplikacije, uključujući rupturu divertikuluma i razvoj akutnog abdomena, kao i intradivertikularnu neoplazmu. Pažljiva evaluacija i ultrazvučni pregled u ambulanti porodične medicine ima važnu ulogu u pravovremenom postavljanju dijagnoze i uspješnoj terapijskoj intervenciji.

LITERATURA

1. Milović N, Bančević V. Ekstravezikalna divertikulektomija – hirurška metoda za rešavanje gigantskih divertikuluma mokraćne bešike. Vojnosanitetski pregled. 2007; 64(5): 349–52. Dostupno na: https://scindeks.ceon.rs/article.aspx?artid=0042-84500705349M.
2. Halaseh SA, Leslie SW. Bladder Diverticulum. [Updated 2023 May 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan. Available at: https://www.ncbi.nlm.nih.gov/books/NBK580557/
3. Janardanan S, Nigam A, Moschonas D, Perry M. Urinary Bladder Diverticulum: A Single-Center Experience in the Management of Refractory Lower Urinary Symptoms Using a Robotic Platform. Cureus. 2023; 15(7): e42354. Available at: https://www.cureus.com/articles/167977-urinary-bladder-diverticulum-a-single-center experience-in-the-management-of-refractory-lower-urinary-symptoms-using-a-robotic-platform#!/

4. Mahul BA, Satish KT. Diverticula. Diagnostic Pathology: Genitourinary (Second Edition). 2016; 478–481. Available at: https://www.sciencedirect.com/topics/medicine-and-dentistry/bladder-diverticulum
5. Nguyen HT, Cilento BG Jr. Pediatric Urology (Second Edition). Chapter 31 – Bladder diverticula, urachal anomalies, and other uncommon anomalies of the bladder. 2010: 416–424. Available at: https://www.sciencedirect.com/science/article/abs/pii/B9781416032045000311 6.
6. Geavlete PA, Georgescu D, Drăguțescu M, Geavlete B. Endoscopic Diagnosis and Treatment in Urinary Bladder Pathology Handbook of Endourology. Chapter 7 – Endoscopic Approach to Bladder Diverticula. 2016; 257–275. Available at: https://www.sciencedirect.com/topics/medicine-and-dentistry/bladder-diverticulum
7. Cardoso VS, Sousa M, Campos Costa F, Pinto Gonçalves P, Guerreiro M. Spontaneous Rupture of a Urinary Bladder Diverticulum in Women: A Rare Cause of an Acute Abdomen. Cureus. 2023; 15(7): e42622. Available at: https://www.cureus.com/articles/165207-spontaneous-rupture-of-a-urinary-bladder-diverticulum-in-women-a-rare-cause-of-an-acute-abdomen#!/
8. Fang C-W, Hsieh VC-R, Huang SK-H, Tsai I-J, Muo C-H, Wu S-C (2019). A population-based cohort study examining the association of documented bladder diverticulum and bladder cancer risk in urology patients. PLoS ONE 14(10): e0222875. Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222875#sec006
9. Sow O, Sarr A, Ze Ondo C, Sine B, Ndiath A, Ndoye AK. Giant bladder diverticulum in a postmenopausal woman: Case report and literature review. Urol Case Rep. 2021 Aug 12; 39: 101807. Available at: https://www.sciencedirect.com/science/article/pii/S2214442021002473
10. Kumar S, Jayant K, Barapatra Y, Rani J, Agrawal S. Giant Urinary Bladder Diverticula presenting as Epigastric Mass and Dyspepsia. Nephro-Urol Mon. 2014; 6(4): e18918. Available at: https://doi.org/10.5812/numonthly.18918.

Marijana Jandrić-Kočić[1], Snežana Knežević[2]

DIVERTICULUM OF THE URINARY BLADDER

Abstract: Bladder diverticulum involves herniations of the mucosa between the smooth muscle fibers of the detrusor. Causes can be acquired, congenital and iatrogenic. They cause serious complications including rupture of the diverticulum and development of acute abdomen, as well as intradiverticular neoplasm. They are often discovered incidentally during radiographic evaluation and study of nonspecific symptoms or signs of the lower urinary system. Diverticulectomy is the procedure of choice in treatment. A 42-year-old man came to the family medicine clinic for a routine check-up. No problems, so far healthy. He has a positive family history of cardiovascular disease and cancer. Ultrasound examination of the abdomen (convex probe 3.5–5 MHz) revealed a large septated cystic change with a diameter of 24x15 mm in the right subhepatic area. Computed tomography in the right half of the hemiabdomen, i.e. in the right infracolic space, identifies a clearly limited thin-walled cystic change of size 108x99x100 mm (LLxAPxCC) that descends in the lower pole into the pelvis. Intraoperatively, it was determined that the cystic change corresponds to a bladder diverticulum. The patient underwent diverticulectomy and Lichtenstein hernioplasty. Recovered, with a stable general condition and satisfactory surgical findings, he was discharged home on the seventh postoperative day. Careful evaluation and ultrasound examination in the family medicine clinic enabled timely diagnosis and successful intervention and prevented serious complications.

Key words: urinary bladder, diverticulum, obstruction, congenital development

INTRODUCTION

Bladder diverticulum includes herniations of the mucosa between the smooth muscle fibers of the detrusor (1, 2, 3). The causes can be acquired, congenital and iatrogenic (1–6). Acquired diverticula are predominantly present in men, most of

[1] Health center Krupa na Uni, Republic Srpska, Bosnia and Hercegovina

[2] Health center Kraljevo, Serbia

whom are older (peak incidence at the age of 60) (4). They are found in 15% of obstructive conditions of the lower urinary tract (4, 6). Smaller dimensions, associated with bladder trabeculation (1, 2, 5). They are made of a thin wall (without muscularis propria) with a narrow neck or opening that communicates with the bladder lumen (4). Congenital diverticula make up about 2% of all bladder diverticula (4). They are more common in men (5:1) and occasionally associated with other congenital syndromes (4). They imply a disorder in the development of the detrusor muscle in the absence of subvesical obstacles (normal intravesical pressure) (5). The wall of congenital diverticulum is formed by all layers of the bladder (including the muscularis propria) (4). They are mostly solitary and often of larger dimensions (1, 2). Bladder diverticula are often asymptomatic (6). In addition, symptoms caused by retention of urine in the diverticulum may be present (1, 3). They are often discovered accidentally during radiographic assessment and study of non-specific symptoms or signs of the lower urinary system (2). Diverticulectomy is the treatment of choice (2).

CASE REPORT

A 42-year-old man came to the family medicine clinic for a routine examination. No problems, so far healthy. He has a positive family history of cardiovascular disease and cancer. A physical examination reveals an orderly finding. Ultrasound examination of the abdomen (convex probe 3.5–5 MHz) revealed a large septated cystic change with a diameter of 24x15 mm in the right subhepatic region (Figure 1). In the laboratory findings, elevated values of leukocytes (10.5 g/L), cholesterol (6.43 mmol/L) and triglycerides (4.4 mmol/L) are present. On the recommendation of the abdominal surgeon, the patient is referred for computed tomography. At the same time, in the right half of the hemiabdomen, i.e. in the right infracolic space, a clearly limited thin-walled cystic change of size 108x99x100 mm (LLxAPxCC) can be seen, which descends in the lower pole into the pelvis. Its anterolateral contour is in close intimate contact with the inner contour of the abdominal wall. The cyst exerts a mass effect, that is, it slightly expands and compresses the surrounding coils of the small intestine. In addition, there is a simple cyst with a diameter of 70 mm on the right extrarenal, a cyst with dense content with a diameter of 32 mm in the lower part of the right kidney and 2 to 3 cysts with a diameter of up to 6 mm interpolarly and in the lower pole of the left kidney. After preoperative antibiotic prophylaxis and deep vein thrombosis prophylaxis, the operation was performed under general endotracheal anesthesia. Intraoperatively, it was determined that the cystic change corresponds to a bladder diverticulum. Diverticulectomy is performed by the urologist, hernioplasty according to Lichtenstein by the abdominal surgeon. Recovered, in a stable general condition and with satisfactory surgical findings, the patient is discharged home on the seventh postoperative day.

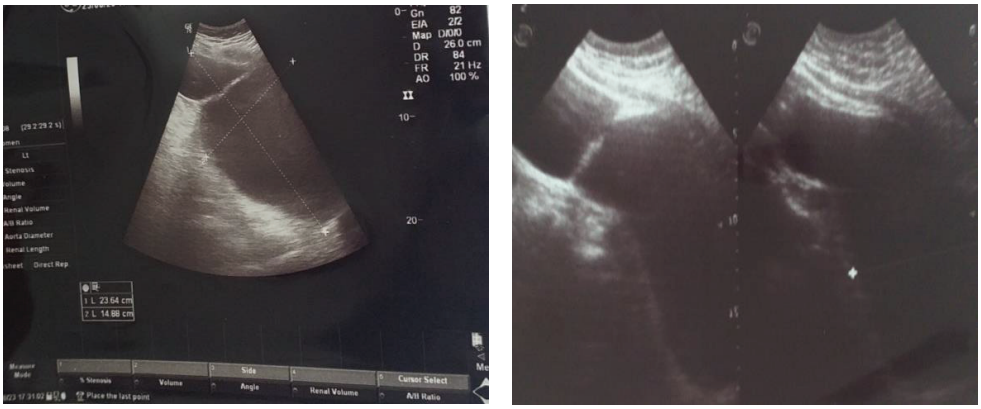


Figure 1. *Abdominal ultrasound*

DISCUSSION

Congenital diverticula are the most common malformations of the urinary bladder (6). They were first described by Hutch in 1962 (1). According to Fox, 98% of congenital diverticula are located in the immediate vicinity of the orifice or on the trigonum of the bladder, and only 2% originate from the fundus (1). They arise due to a defect in the connection between the trigonum and the remaining part of the bladder wall, which have a different embryological origin (the trigonum is of mesodermal origin, the remaining part of the bladder wall arises from the endoderm) (1, 6). Diverticula on the vertex originate from the urachus (1). There are also special forms of bladder diverticulum that are the result of intrauterine subvesical obstruction (congenital bladder neck contracture, presence of the posterior urethral valve) or bladder innervation disorder (sphincterospasm) (1). Congenital diverticulums are solitary with dimensions that vary considerably and may be equal to or greater than the volume of the urinary bladder (6). The dimensions and shape of the communication opening between the diverticulum and the urinary bladder are significant, bearing in mind that because the communication opening causes difficulty in diverticular drainage with an intradiverticular path of urine (6). On the other hand, acquired diverticulum is a renoureteral protective mechanism against increased intravesical pressure caused by posterior urethral valve, anterior urethral diverticulum, urethral stricture, neurogenic bladder dysfunction or vesicosphincteric dysfunction (6). Very rarely, they arise iatrogenically (detrusor myotomy) (6). There is an opinion that they can also occur after a urinary infection that weakens the detrusor muscle (5). Acquired diverticulums are multiple and usually smaller in size (1).

Bladder diverticula are very often asymptomatic (7). However, retention of urine in the diverticulum can cause hematuria due to calculus, urinary tract infection, reflux and ureteral obstruction, urinary retention, rupture of the diverticulum and development of acute abdomen, dysplasia, metaplasia, leukoplakia and intradiverticular neoplasm (0.8%–10%) (1 ,7, 8). Ultrasound determines the presence of diverticulum, changes in the upper urinary tract and subvesical obstructions (9). Computed tomography determines the exact dimensions of the diverticulum, the proximity of the back surface of the diverticulum and the adjacent organs (rectum and homolateral ureter) (9). Cystoscopy identifies the dimensions of the neck of the diverticulum and its position in relation to the ureteral meatus (9). Retrograde urethrocystography is the method of choice for detecting bladder diverticula (9). Urodynamic examination provides additional information that is very useful in etiological research (9). The differential diagnosis includes anomalies of the uterus, ovaries and fallopian tubes, urachal cysts, ectopic ureters, ureterocoeles, Muller's cysts, postoperative changes such as lymphocele (2). In a small number of acquired diverticulum, with the removal of the obstruction, the diverticulum recedes (10). The largest number of diverticulum requires diverticulectomy, which can be performed with an extravesical, intravesical or combined approach (9).

In the presented case, considering the position, size and solitary nature of the diverticulum, it was most likely a congenital diverticulum. Timely diagnosis and successful intervention prevented serious complications.

CONCLUSION

Bladder diverticula have no unique presentation and are usually discovered incidentally. They cause serious complications including rupture of diverticulum and development of acute abdomen, as well as intradiverticular neoplasm. Careful evaluation and ultrasound examination in the family medicine clinic plays an important role in timely diagnosis and successful therapeutic intervention.

LITERATURE

1. Milović N, Bančević V. Ekstravezikalna divertikulektomija – hirurška metoda za rešavanje gigantskih divertikuluma mokraćne bešike. Vojnosanitetski pregled. 2007; 64(5): 349–52. Dostupno na: https://scindeks.ceon.rs/article.aspx?artid=0042-84500705349M.
2. Halaseh SA, Leslie SW. Bladder Diverticulum. [Updated 2023 May 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan. Available at: https://www.ncbi.nlm.nih.gov/books/NBK580557/

3. Janardanan S, Nigam A, Moschonas D, Perry M. Urinary Bladder Diverticulum: A Single-Center Experience in the Management of Refractory Lower Urinary Symptoms Using a Robotic Platform. Cureus. 2023; 15(7): e42354. Available at: https://www.cureus.com/articles/167977-urinary-bladder-diverticulum-a-single-center experience-in-the-management-of-refractory-lower-urinary-symptoms-using-a-robotic-platform#!/
4. Mahul BA, Satish KT. Diverticula. Diagnostic Pathology: Genitourinary (Second Edition). 2016; 478–481. Available at: https://www.sciencedirect.com/topics/medicine-and-dentistry/bladder-diverticulum
5. Nguyen HT, Cilento BG Jr. Pediatric Urology (Second Edition). Chapter 31 – Bladder diverticula, urachal anomalies, and other uncommon anomalies of the bladder. 2010: 416–424. Available at: https://www.sciencedirect.com/science/article/abs/pii/B9781416032045000311 6.
6. Geavlete PA, Georgescu D, Drăguțescu M, Geavlete B. Endoscopic Diagnosis and Treatment in Urinary Bladder Pathology Handbook of Endourology. Chapter 7 – Endoscopic Approach to Bladder Diverticula. 2016; 257–275. Available at: https://www.sciencedirect.com/topics/medicine-and-dentistry/bladder-diverticulum
7. Cardoso VS, Sousa M, Campos Costa F, Pinto Gonçalves P, Guerreiro M. Spontaneous Rupture of a Urinary Bladder Diverticulum in Women: A Rare Cause of an Acute Abdomen. Cureus. 2023; 15(7): e42622. Available at: https://www.cureus.com/articles/165207-spontaneous-rupture-of-a-urinary-bladder-diverticulum-in-women-a-rare-cause-of-an-acute-abdomen#!/
8. Fang C-W, Hsieh VC-R, Huang SK-H, Tsai I-J, Muo C-H, Wu S-C (2019). A population-based cohort study examining the association of documented bladder diverticulum and bladder cancer risk in urology patients. PLoS ONE 14(10): e0222875. Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222875#sec006
9. Sow O, Sarr A, Ze Ondo C, Sine B, Ndiath A, Ndoye AK. Giant bladder diverticulum in a postmenopausal woman: Case report and literature review. Urol Case Rep. 2021 Aug 12; 39: 101807. Available at: https://www.sciencedirect.com/science/article/pii/S2214442021002473
10. Kumar S, Jayant K, Barapatra Y, Rani J, Agrawal S. Giant Urinary Bladder Diverticula presenting as Epigastric Mass and Dyspepsia. Nephro-Urol Mon. 2014; 6(4): e18918. Available at: https://doi.org/10.5812/numonthly.18918.