

VESICO-VAGINAL REFLUX

Harmeet S. Dhillon^{1,2}, Serova N.S.¹

Vesicovaginal reflux is a well-known entity rarely encountered by radiologists. It is a behavioural disorder, a type of dysfunctional elimination syndrome commonly encountered in pre-pubertal girls. It is defined as reflux of urine into the vaginal vault either in supine or upright position during voiding. The clinical presentation varies from asymptomatic bacteriuria, dysuria, recurrent urinary tract infections, vulvovaginitis to post-voiding incontinence. Although usually diagnosed clinically, radiological diagnosis is usually made by complete resolution of hydrocolpos on a post-voiding scan. It is important for the radiologist to be aware of this entity so as to differentiate this functional disorder presenting as hydrocolpos from other obstructive causes of hydrocolpos which require surgical management. Vesicovaginal reflux is a common cause of urinary incontinence in girls. A micturating cystourethrogram, which is the diagnostic investigation of choice, can demonstrate retrograde filling of the vagina during micturition and the complete emptying of the vagina at the end of micturition. Vesicovaginal reflux is a rare cause of gross hydrocolpos occurring without any anatomical obstruction. The condition may be associated with functional voiding disturbances.

1 - I.M. Sechenov First Moscow State Medical University (Sechenov University).
Moscow, Russia.

2 - Dr. Sunny medical centre.
Al Shahba, Sharjah,
UAE.

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Corresponding author: *Harmeet S. Dhillon*, e-mail: harmeetsingh333@mail.ru

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ВЕЗИКО-ВАГИНАЛЬНЫЙ РЕФЛЮКС

Диллон Х.С.^{1,2}, Серова Н.С.¹

Везико-вагинальный рефлюкс является широко известной патологией, с которой редко встречаются рентгенологи. Заболевание носит поведенческий тип расстройств и является частью синдрома нарушения экскреции у девочек препубертатного периода. Основным признаком заболевания является рефлюкс мочи в свод влагалища в положении лежа или стоя во время опорожнения. Клинические проявления варьируют от асимптоматической бактериурии, дизурии, рецидивирующих инфекционных заболеваний мочевыделительного тракта и вульвовагинита до недержания мочи. Несмотря на то, что данное состояние обычно диагностируется клинически, методы лучевой диагностики применяют для подтверждения гидрокольпоса на изображениях после опорожнения. Для рентгенологов крайне важно знать об этом заболевании для дифференцировки функциональных расстройств по типу гидрокольпоса от обструктивных причин гидрокольпоса, которые требуют хирургического лечения. Везико-вагинальный рефлюкс является частой причиной недержания мочи у девочек. Микционная цистоуретрограмма является методом выбора диагностики таких состояний и может демонстрировать ретроградное заполнение влагалища во время мочеиспускания и её полное опорожнение в конце мочеиспускания. Везико-вагинальный рефлюкс является редкой причиной выраженного гидрокольпоса, возникающего без какой-либо обструкции. Это состояние также может быть ассоциировано с функциональными нарушениями мочеиспускания.

1 - ФГАОУ ВО Первый Московский
Медицинский
Университет имени
И.М. Сеченова
Минздрава России
(Сеченовский
Университет)
Москва, Россия.

2 - Медицинский Центр
доктора Санни.
Аль Шахба, Шарджа,
ОАЭ.

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Контактный автор: *Harmeet S. Dhillon*, e-mail: *harmeetsingh333@mail.ru*

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A 4-year 3 month-old child was admitted to the clinic with foul smelling whitish urinary incontinence since childhood. Clinical examination revealed normal external genitalia. There was continuous dribbling of urine from the vagina. Renal function tests and blood counts were within normal limits. Urine examination (fig. 1) revealed numerous pus cells, red blood cells and epithelial cells. There was significant bacteriuria; *Escherichia coli* was isolated. Ultrasonogra-

phy of the abdomen and pelvis revealed a grossly distended fluid-filled vagina that was suggestive of hydrocolpos (fig 2). The uterus, both ovaries and the urinary bladder were normal (fig. 2). Postmicturition study showed complete evacuation of the vaginal fluid and postvoid residual urine of 31 ml in the urinary bladder (fig. 2). The ureteric jets on both sides were normally seen within the bladder. No obvious reproductive tract abnormalities were seen. An intravenous pyelogram (IVP) did not

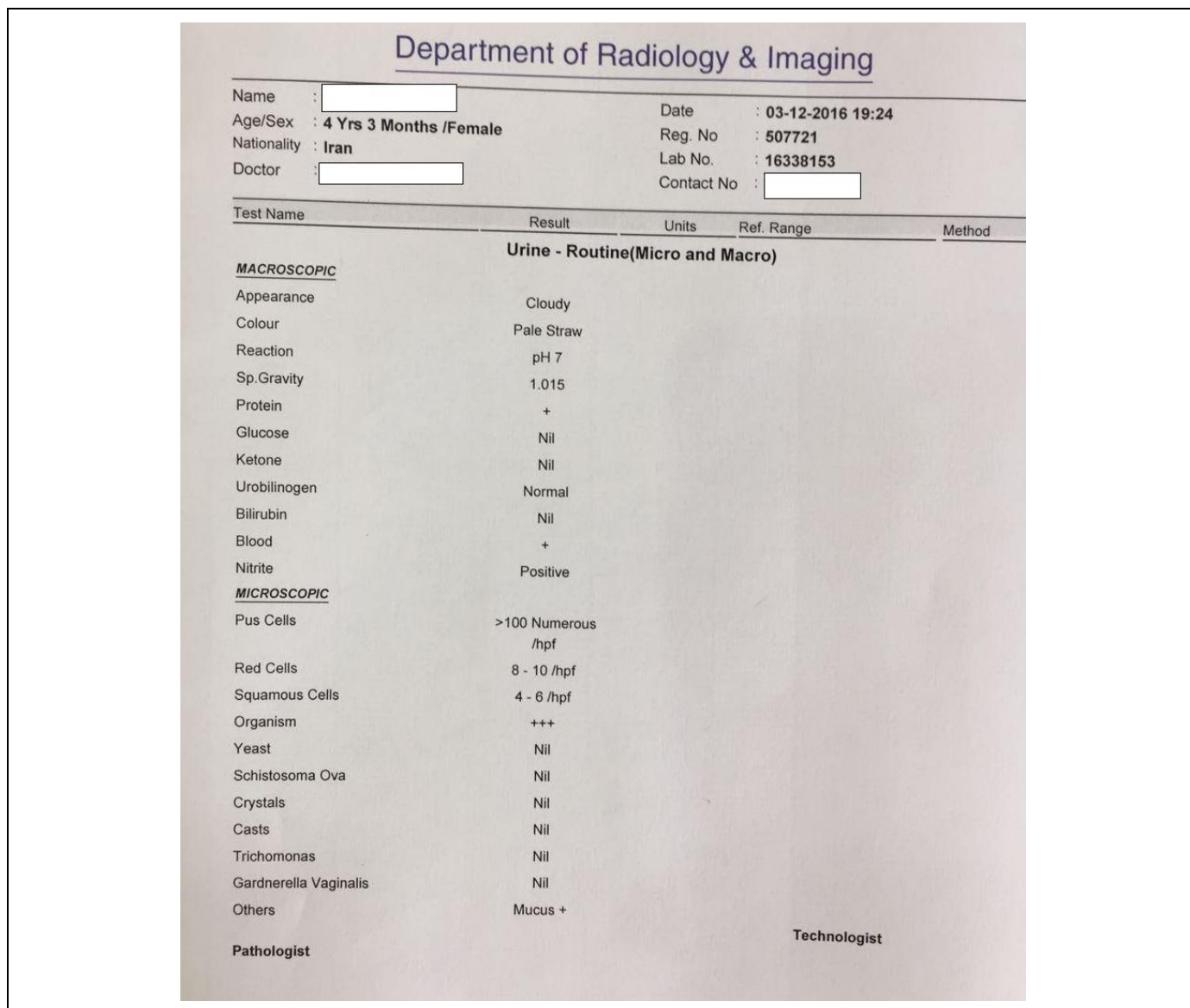


Fig. 1. Photo.

Urine examination revealed numerous pus cells, red blood cells and epithelial cells.



Fig. 2.

Fig. 2. Sonograms.

USG pelvis shows a grossly distended fluid-filled vagina, posterior to the urinary bladder suggestive of hydrocolpos. 3D reformatted image demonstrates a grossly distended, fluid-filled vagina, suggestive of hydrocolpos.



Fig. 3 a

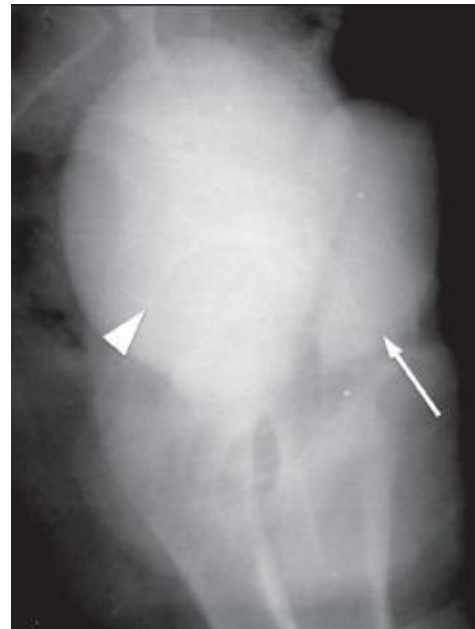


Fig. 3 b

Fig. 3. X-ray intravenous urograms.

AP projection (a) shows normal renal collecting systems without ureteric ectopia. Lateral projection (b) shows a contrast-filled vagina (arrow), separate and posterior to the urinary bladder (arrowhead)

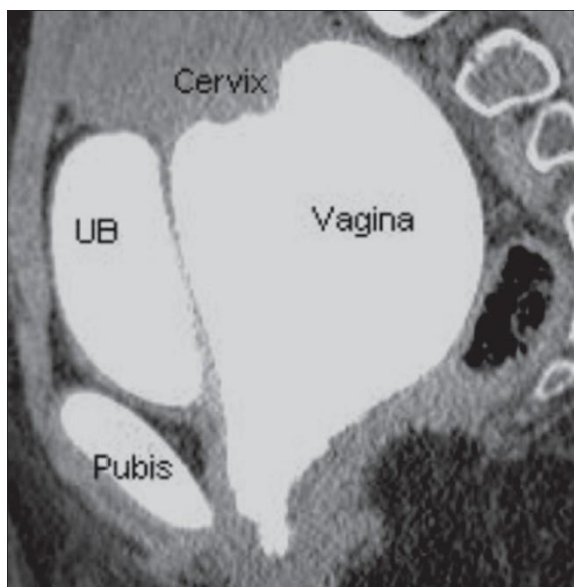


Fig. 4. MSCT, sagittal reconstruction.

CT of the pelvis shows a contrast filled vagina, separate and posterior to the urinary bladder, without any anomalous connection/extravasation.

reveal any ureteral ectopia (fig 3a). A separate contrast-filled sac was seen posterior to the urinary bladder in the lateral projection of the pelvis, consistent with a distended vagina (fig 3 b). Limited MSCT sections of the pelvis (fig. 4) were obtained in the same sitting as the IVP so as to rule out a vesicovaginal fistula and confirm the absence of ureteral ectopia. Voiding cystourethrography revealed a normal filling phase, without any extravasation. A widened urinary bladder neck was noted (fig. 5 a). The early voiding phase demonstrated progressive gross distention of the vagina due to retrograde filling as the bladder emptied (fig. 5 b,c). The late voiding phase demonstrated progressive complete evacuation of the vagina (fig. 5 d). No vesicoureteral reflux (VUR) was seen bilaterally.

Discussion.

Even though VVR is commonly encountered, it is an uncommon cause of hydrocolpos. Vesico-vaginal reflux causes retrograde filling of the vagina during micturition. It can occur in both, the supine and the upright positions [1]. Urinary incontinence, recurrent urinary tract infection (UTI), wetting, vulvovaginitis, irritation of the genitalia,

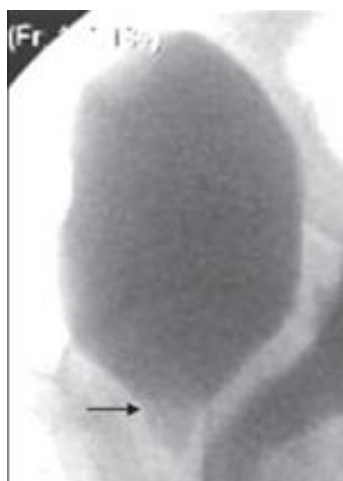


Fig. 5 a



Fig. 5 b



Fig. 5 c



Fig. 5 d

Fig. 5. Voiding cystourethrogram.

Widened bladder neck is seen (arrow) (a). The early voiding phases (b, c) show gross distention of the vagina due to retrograde filling with progressive bladder (UB) emptying. Late voiding phase (d) shows subtotal evacuation of vaginal collection.

bad smell and vaginal discharge may be the various presentations [1 - 5]. The UTI may be real or due to contamination of urine by the vaginal flora. The condition is common in prepubertal children; however, it may also be seen in postpubertal girls and women [3]. The vaginal distention may be complete, partial or minimal; gross distention is relatively uncommon [4]. The urogenital tract anatomy is usually normal for age [3, 4]. A relatively horizontal vagina in the prepubertal age, tightly apposed labia in obese subjects, labia minora adhesions, hypospadiasis and spastic pelvic floor muscles (as seen in patients with cerebral palsy) are the various etiologies proposed for the occurrence of VVR [1, 3, 5-7]. The diagnosis of VVR is indicated by resolution of the hydrocolpos on a postvoid USG and can be confirmed with a

voiding cystourethrogram, which shows gradual distension of the vagina during micturition due to its retrograde filling as the bladder empties. A wide bladder neck, as seen in our patient, a spinning top urethra or low-bladder volumes may be the associated functional voiding disturbances [1, 8, 9]. Gross hydrocolpos makes the present case unusual. Absence of hydrometra and a normal menstrual history ruled out an imperforate hymen. The fluid-filled vagina seen posterior to the distended urinary bladder could have been confused with a distended rectum on USG; however, this was ruled out on seeing the cervix suspended at its upper end. Instructions on proper voiding form a key element in the management of VVR [3, 10 - 13].

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