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Case Report

Unusual presentation of duplex kidney with poor functioning upper moiety in an adult patient a case report

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Abstract

Renal duplexing (also known as a duplicate collection system) occurs in about 1% of children and does not usually require medical attention. The condition results in two tubes rather than the normal single ureter tube for each kidney. Medical problems that warrant attention are obstruction of urine flow or the backflow of urine into the kidney (reflux). These double ureter tubes can join in a "y" shape before reaching the bladder (partial duplex) and combining their urine delivery. In other cases, each duplicate ureter empties into the bladder on its own (complete duplex). There is cause for concern when a duplex kidney is associated with urological conditions requiring treatment.

Renal duplexing can cause urine to reflux into the kidney (vesicoureteral reflux) rather than going into the bladder and can cause subsequent Urinary Tract Infection (UTI).

This can result in serious consequences like the loss of renal parenchyma (reflux nephropathy) and sometimes death in acute infections if not attended to in a timely manner. Weigert-Meyer postulated that rule i-e in a complete duplex system is mostly associated with reflux in lower moiety and obstruction in upper moiety with ectopic insertion and ureterocele. Ureteroceles may require simple management of symptoms or surgery, depending on the size of the ballooning, the functioning of the kidney and bladder and the degree of urine obstruction. An ectopic ureter is when the ureter opens and drains urine outside the bladder rather than inside.

Introduction

The urinary tract, composed of the kidneys, ureters, bladder and urethra, represents the principal excretory machine of the mammalian organism. Development of the urinary system, made of more than forty one-of-a-kind molecular types, wants to hold in a substitute-prepared manner. Given this complexity, it isn`t constantly surprising that mutations in developmental genes can result in a giant form of abnormalities which might be normally grouped collectively as Congenital Abnormalities of The Kidneys and Urinary Tract (CAKUT).

Development of the urinary system

To recognize the etiology of duplex kidneys, it's far important to bear in mind how the urinary system work from a developmental point of view, the urogenital tract derives from two unbiased germ layers with kidneys and ureter arising up from the Intermediate Mesoderm (IM) and the bladder and urethra developing from cloacal endoderm [1] improvement of the urinary system isn't always constrained to kidney formation but additionally involves the huge developmental reworking of the lower tract.

In Partial two separate ureters are attached to the same kidney however part far away from the kidney forms a single ureter that enters the bladder.

Complete: separate ureters lead far away from the equal kidney and enter the bladder. A duplex

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kidney, moreover, known as a duplex renal amassing system, consists of 2 ureters springing up from one kidney. This condition is typically the asymptomatic normal variant. Most are asymptomatic and are decided randomly and present as normal functioning kidneys with entire or partial duplication [2]. In symptomatic cases, the obstruction may additionally stand up at the better pole and may be associated with abnormalities such as an ectopic ureter or ureterocele, even as VUR is associated with the lower pole [2,3]. However, abnormal anatomic versions such as hydronephrosis, vesicoureteral reflux (VUR), and ureterocele are every now and then placed in an affected individual with a duplicated kidney. A duplex kidney system with an ectopic ureter draining into the vagina is a congenital malformation that typically presents as refractory urinary incontinence. Using modern imaging techniques, it`s miles viable to delineate the anatomical and functional status of a duplex system and select appropriate management [4] USG is a smooth approach for demonstrating hydronephrosis in obstructed duplicated systems, but it does now not allow visualization of the ideal path of the ureters [5]. intravenous urography or pyelography also can moreover provide records of the collection system anatomy. Dynamic renal scintigraphy can show the sensible effects of urinary obstruction, but it has an insufficient spatial selection in times of reduced renal function. In our department, a dynamic MAG3 renogram is executed in all patients with better tract dilatation, which consists of asymptomatic patients with renal pelvic dilatation [6].

Intraoperative cystoscopy combined with a retrograde ureter pyelogram in advance of surgical correction is a different preference to make clean the anatomy of duplication anomalies [7]. Indications for surgical remedy include symptoms, obstruction or impaired characteristics of the affected renal moiety and failure of conservative management. The surgical technique is predicated upon the anatomical talents and degree of renal characteristics [8]. If there can be large hydronephrosis and a dysplastic pole without or poor characteristics withinside the parenchyma, a heminephrectomy of the affected pole may be selected [6]. A massive dismembered pyeloplasty is the most appropriate opportunity for complete or nearly complete duplex systems [9].

The presence or absence of reflux influences surgical treatment, which also can furthermore encompass ureteral reimplantation, ureteroureterostomy and/or top pole nephrectomy. VUR is more frequently located in affiliation with ureteral duplication than in an unmarried system and looks in 70% of sufferers with contamination and ureteral duplication.

Case presentation

18 years old female presented with complaints of urge incontinence, dysuria on and off for the last 6 months and nocturnal enuresis from age of 9 to 10. Her past history is significant, she underwent an oophorectomy for immature teratoma stage IA, followed by 3 cycles of adjuvant chemotherapy 10 years back. Her physical examination was unremarkable except for small scars for laparoscopic ports from previous surgery. Baseline laboratory workups (hematology, KIDNEY function tests) were within normal limits.

Ultrasound of abdomen and pelvis Showed right duplex renal system, upper moiety 6.7 cm moderate to severe hydronephrosis, Lower moiety 7.8 cm normal texture no hydronephrosis and no renal calculus, left kidney, Urinary bladder and Rest of the viscera were normal (Figure 1).

CT scan abdomen and pelvis without contrast was also done which demonstrates the right complete duplex kidney with upper moiety hydronephroureter.

The ureter of the upper moiety was ectopically opening in the vagina; the lower moiety was unremarkable its ureter was opening normally into the urinary bladder. The left kidney was normal. The left ovary was not visualized with a history of oophorectomy right ovary was unremarkable (Figure 2).

MAG-3 radionucleotide scan was performed that showed the right duplex renal system with a differential function of 39%, upper moiety was completely nonfunctioning while lower moiety was fair functioning and Normal functioning left kidney with a differential function of 61% (Figure 3).

The intraoperative findings were suggestive of a duplex kidney with nonfunctioning upper moiety, so we performed a right upper moiety hemi-nephrectomy with ureterectomy after counseling and consent (Figure 4).

Outcome and follow-up

Postoperatively, she made extremely good healing and has become discharged and now no longer the usage of complications. Furthermore, gross evaluation of specimen histopathological popularity showed continual nonspecific infection no evidence of TB or tumor seen no kidney parenchyma

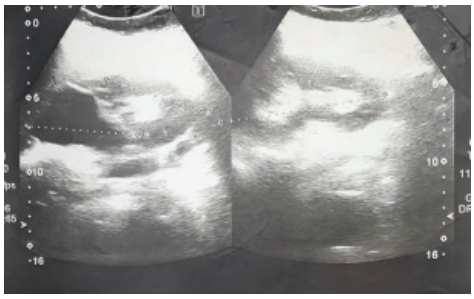

Figure 1: Ultrasound pelvis showing duplex renal system.

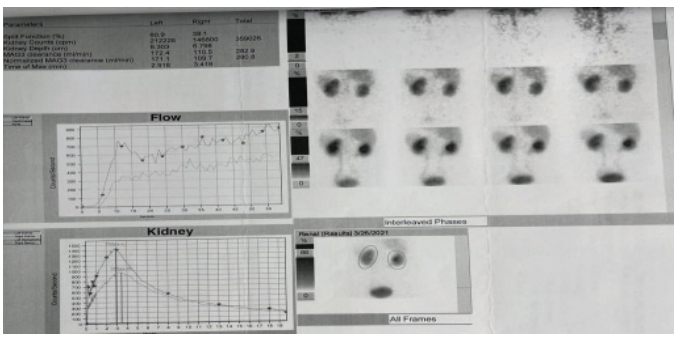

Figure 2: Ct scan showing right Duplex kidney and Left Normal Kidney.

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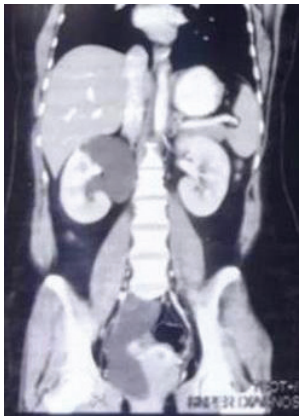

Figure 3: MAG-3 radionucleotide scan was performed that showed right duplex renal system. MAG-3 radionucleotide scan was performed that showed right duplex renal system with differential function of 39%.

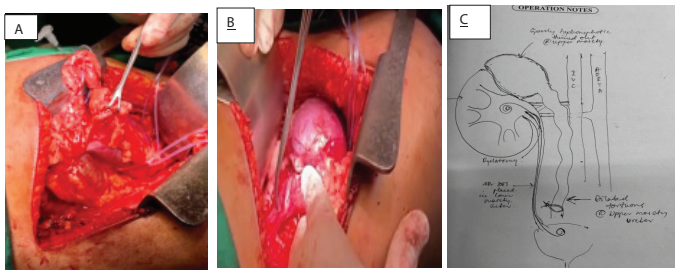

Figure 4: Per operative picture demonstrating both ureters being taken on separate slings and both moieties can also be seen (A and B). Diagrammatic representation of operative findings and procedure (C) pictorial presentation of intraoperative findings of duplex kidney.

Discussion

Duplex-collecting structures are the most now no longer unusual place anomaly of the urinary system and can be incomplete or complete [1]. Most duplications are incomplete, with the confluence of the ureters localized finally above the ureteral orifice [1]. Renal duplication anomalies aren't unusual withinside the better urinary tracts of children (0.8%) and are extra now no longer unusual place in girls [9]. Estimates recommend a prevalence of duplex kidneys of between 0.2 and 2% withinside the usual population, and women have affected instances as often as grownup men 38, 43. The reasons for this sex bias are unknown. About 40% of patients with duplex kidneys were stated to show off pathological manifestations.

However, because of the reality that duplex kidneys are regularly asymptomatic and therefore predominantly detected in patients who're searching out medical assistance, the actual percentage of patients with symptoms and symptoms might be to be lower. Symptoms associated with duplex kidneys can include pain, hematuria, dysuria and hassle or regular frequency of micturition 12, 13.

The duplex kidney is a quit result of errors in the molecular branch that stand up at a few degrees withinside the development of the fetus in the mother`s womb. There isn`t any evidence that suggests a few factors all through pregnancy motive the defect. However, there can be evidence to show that the state of affairs can be passed from parent to child. If one determines has a duplex kidney, the child has a 50-50 risk of moreover being born with this situation. In the duplex kidney situation, the kidney paperwork in two, duplicate additives with separate ureter tubes, further to a separate blood supply Most human beings do now not need treatment. If needed, treatments include.

The ectopic ureter is split near your bladder, then sewn into the normal ureter of the lower part of your kidney. This lets urine from the better part of the kidney drain normally. There are various ways one is Ureteroureterostomy in which the ectopic ureter is split near your bladder, then sewn into the normal ureter of the lower part of your kidney. This allows urine from the upper part of the kidney to drain normally, second is Ureteral reimplantation in which the ectopic ureter is split near the bottom and sewn into your bladder. This lets urine drain efficiently and now not go along with the go with flow backward. one of the treatment options is nephrectomy in this treatment which is the last resort in it, some, or all of your kidney that isn`t constantly running efficiently is surgically removed. This receives rid of incontinence and decreases the danger of infection. This surgical treatment must be used handiest even as kidney function is horrific and the opportunity kidney is jogging normally.

Indications for surgical treatment encompass symptoms, obstruction or impaired feature of the affected renal moiety and failure of conservative management. The surgical approach is primarily based totally upon the anatomical capabilities and diploma of renal features [10]. If there`s massive hydronephrosis and a dysplastic pole and now not using a lousy feature withinside the parenchyma, a heminephrectomy of the affected pole can be selected [6]. A well-known dismembered pyeloplasty is the maximum suitable desire for entire or almost entire duplex systems [11]. The presence or absence of reflux impacts surgical remedy, which may additionally furthermore encompass ureteral reimplantation, ureteroureterostomy and/or higher pole nephrectomy. VUR is more frequently positioned in affiliation with ureteral duplication than in an unmarried device and looks in 70% of sufferers with contamination and ureteral duplication. Duplex-collecting structures are the maximum common anomaly of the urinary system and can be incomplete or complete [1]. Most duplications are incomplete, with the confluence of the ureters localized in a few unspecified times withinside the future above the ureteral orifice [1]. Renal duplication anomalies are not unusual to place withinside the better urinary tracts of children (0.8%) and are more common in girls [9].

Estimates propose an occurrence of duplex kidneys among 0.2 and 2% withinside the popular population, and girls are affected two times as often as boys [10,12]. The motives for this intercourse bias are unknown. About 40% of sufferers with duplex kidneys had been said to show off pathological manifestations [10]

However, due to the fact duplex kidneys are often asymptomatic and consequently predominantly detected in sufferers who are searching for clinical assistance, the real percentage of sufferers with signs and symptoms is probably to be decreased. Symptoms related to duplex kidneys can encompass pain, hematuria, dysuria and trouble or odd

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frequency of micturition [10,12] An incomplete duplex kidney is a congenital anomaly regarding the confluence of the 2 separate ureters localized at someplace above the ureterovesical orifice (1). Ureteric junction obstruction (UPJO), that is some other not unusual place congenital anomaly, may be related to an incomplete duplex kidney. Intraoperative cystoscopy mixed with a retrograde ureter pyelogram earlier than surgical correction is some other choice to make clear the anatomy of duplication anomalies [9]. Three sufferers required an excretory urogram. In some other three patients, the right anatomy becomes validated simplest at some point of surgery. In duplex systems, the decreased moieties are much more likely to be an issue for UPJO in comparison with the top pole [10,13].

Conclusion

Duplicated collecting systems and UPJO are common anomalies of the urinary system that constitute a challenge to pediatric urologists and nephrologists in phrases of diagnostic assessment and sort of surgery, regardless of development in pediatric radiological imaging, analysis and management. Treatment must be individualized primarily based totally on medical presentation, anatomy (lower/top pole), duplication type and severity of obstruction on a dynamic renogram. Although the maximum troubles of duplex structures are ureteroceles and reflux, UPJO must usually be taken into consideration. A duplex kidney and amassing device must be taken into consideration while persistent urologic troubles occur. This document suggests that due to the fact duplex kidney is a fantastically common congenital abnormality, it must be taken into consideration withinside the differential analysis in younger patients who gift with the renal cyst. This case additionally suggests that sufferers may be controlled efficiently by the usage of robot-assisted heminephrectomy.

Ethical approval

Written informed consent has been taken to publish the article from the patient and from the institutional review board IRB.

Guarantor

HK

Contributor ship

Hina Khalid: is the main author, writing the case report and performing a literature review for the discussion.

Naveed Ahmed Mahar

undertook and provided information on the surgical procedure and edited the manuscript. ML supervised and helped in the literature search.

Murli Lal Professor

undertook and provided information on the surgical procedure and edited the manuscript. ML supervised and helped in the literature search.

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