PERSISTENT UROGENITAL SINUS

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ABSTRACT

Persistent urogenital sinus is a developmental cloacal anomaly, which presents as a single common passage for urethra and vagina in female neonates. Neonates with urogenital sinus frequently have ambiguous genitalia, rarely the vulva may be normal. Incidence is 0.6in10000 female births. This anomaly is associated with a wide variety of syndromes. Accurate prenatal diagnosis is possible by ultrasound. Treatment is surgical corrective repair. Molecular factors have been implicated as a possible cause by various workers.

KEY WORDS: Urogenital Sinus, Cloaca, Ambiguous genitalia, Hydrometrocolpos, Hydronephrosis.

INTRODUCTION

Persistent urogenital sinus is an anomaly of the cloaca. Reported incidence is 0.6 in 10,000 female births (Clavelli,2004)[1].

In female neonates it can present as a single common passage for urethra and vagina. The urethro-vaginal communication allows urine to empty from the urinary bladder to the exterior. A long urogenital sinus with a short vagina and a high urethral opening results when the defect occurs at an early stage. A short urogenital sinus, with almost normal length vaginal vestibule and low urethral opening, results when the defect occurs later in embryonic development (Nazir et al, 2006)[2]. Neonates with persistent urogenital sinus present with abdominal distention. They frequently have ambiguous genitalia, rarely the vulva may be normal, as seen in the case being reported. Examination of external genitalia, voiding cystouretherogram, genitoscopy and genitography confirm the presence of persistent urogenital sinus with urinary retention in uterus and vagina (Revest et al, 2001)[3]. The vaginal wall gets edematous and swollen and thus may cause backpressure changes leading to hydronephrosis.

CASE REPORT

A 2 hour old female baby, delivered by LSCS to a 25 yrs old (G2P1A0) woman, presented to hospital, with gross abdominal distention.

Birth history- Weight 3 kg, immediate cry, meconium not passed, urine passed within 1 hour.

Antenatal History- No history of consanguinity /any fever or drug intake during pregnancy /congenital anomalies in the family. First-born normal male child was 3 yr. old.

Abdominal examination: Umbilical stump was intact. Abdominal distention observed. On palpation, there was a mass that seemed to be arising from the pelvis, extending upto the sub-costal margin. External genitalia normally developed. Solitary opening seen between labia minora. Urine passed from the opening. Anal opening was normal in position and size, with respect to the vestibule.

There was no associated anomaly of any other system.

On ultrasonography, cystic space occupying lesion (6.5x5.2x6.5cm) arising from pelvis, posterior to urinary bladder, extending to pre-sacral space was seen. Bilateral hydronephrosis was present. Provisional diagnosis of hydrometrocolpos with hydronephrosis was made.

MRI: Large pelvic cyst with features suggestive of Hydrometrocolpos seen. Bilateral hydronephrotic kidneys seen (Figure 1).

Operative Notes: Uterus was raised up to undersurface of liver. Bladder was grossly distended and hypertrophic. Diagnosis of persistent urogenital sinus was made. Suprapubic cystostomy was done after decompression, under general anaesthesia.

Three weeks post-operative: catheter was removed.

One-year post-operative: On ultrasonography, kidneys, ureter and bladder and uterus normal. No hydrometrocolpos or hydronephrosis.

DISCUSSION

1. Urogenital sinus malformation can be ascribed to an arrest of normal embryonic cloacal development.

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The cloaca is an endoderm-lined dilated caudal end of hindgut that is first apparent at the beginning of second week of gestation.

2. Just before the fourth week of gestation, it receives the Mesonephric ductal system. The urorectal septum appears during the fourth week of development and grows to divide the cloaca into ventral urogenital sinus and dorsal primitive rectum, by week six to seven of development.

3. During this phase, paired Mullerian ducts, which form from the coelomic epithelium, develop lateral to the Mesonephric ducts to cross ventro-medially and fuse in the midline joining the urogenital sinus to produce an elevation called Mullerian tubercle. The fused part forms a common utero-vaginal canal, giving rise to uterus and upper vagina.

4. Koff in 1933(cited in Moore, 2004)[4] delineated that mullerian tubercle induces formation of paired caudal endodermal outgrowths (Sino-vaginal bulbs) from the urogenital sinus. The cells within the Sino-vaginal bulbs proliferate to form a cord of tissue called the vaginal plate later canalized in a caudal-to-cranial

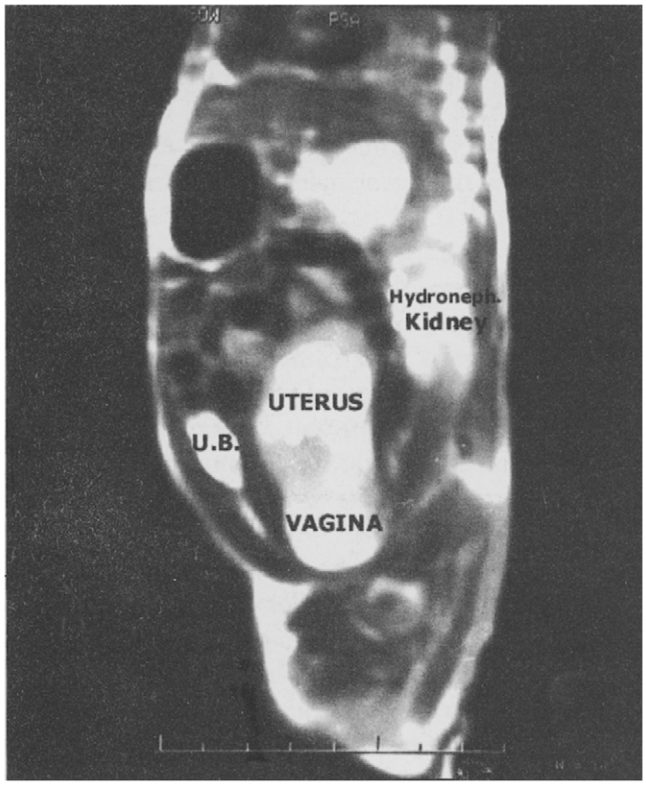

Figure 1: To show the distended uterus, vagina & urinary bladder along with hydronephrosis.

direction to form distal vagina. The portion of urogenital sinus distal to the mullerian tubercle undergoes exstrophy and everts to become the vestibule. As a result of this process, the urethra and vagina acquire separate openings in the vulva (Moore, 2004).

The lumen of vagina is separated from the cavity of urogenital sinus by the hymen, an invagination of posterior wall of urogenital sinus. Rupture of hymen occurs during the perinatal period (Moore, 2004)[4].

5. Embryological Explanation- Probably, in the present case, the arrest in development was in the later stages. The exstrophy and evertion of the distal urogenital sinus failed to occur, thus, the vagina and urethra did not acquire separate openings on the vulva.

Molecular basis-A lot of work, at molecular level, has been done on anomalies of the urogenital system in chick embryos, mutant mice alleles and targeted mice embryos.

Sonic hedgehog (shh) is an endoderm-derived signaling molecule, which induces mesodermal gene expression in the chick hindgut. Shh-null mutant mice display persistent cloacae (Mo et al, 2001)[5]. Therefore, shh signaling is essential for normal development of distal hindgut in mice.

Also, shh is expressed in the cloacal epithelia and is vital for regulation of structures derived from urogenital sinus (Mo et al, 2001[5]; Freestone et al, 2003[7]; Pu et al, 2004)[8].

Haraguchi et al (2007)[9] also corroborated these findings and observed shh expression in epithelium lining the cloaca, the urethral plate, the internal urethra and the luminal epithelium of the bladder. By genetically labeling the hedgehog responding tissue lineages, they defined contribution of peri-cloacal mesenchyme to the bladder and external genitalia. They concluded that hedgehog signaling orchestrated co-ordinated formation of bladder, internal urethra and external genitalia.

Associated Anomalies- Syndromes associated with urogenital sinus anomalies are:

- Mc kusick-kaufman syndrome- Persistent urogenital sinus and Polydactly (Arena et al, 1999)[10].
- Bardet-Biedel syndrome- Persistent urogenital sinus, digital anomalies, tapeto-retinal degeneration, obesity, renal abnormalities and hypogenitalism in males (Stoler et al, 1995)[11].
- Hand-foot-genital syndrome-A mutation of Hoxa13 is associated with this, in which females have mullerian abnormalities and males may have

hypospadias, along with limb anomalies (Goodman et al, 2000 and Mortlock et al, 1997)[12].

A common link between limb & urogenital organ development has been documented by various workers e.g. Richards et al(1980)[18],Kondo et al(1997), Yang et al(1999)[19] Revest et al(2001)[16],Perriton et al(2002)[17], Morgan et al(2003)[15],Stadler(2003)[16].No associated anomaly was seen in this case.

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