

Urorectal Septum Malformation Sequence: A Case Report

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Congenital absence of perineal and/or anal openings and associated anomalies have been reported previously. Several authors have reported different features of this spectrum from hypoplastic pelvic outlets to female pseudohermaphroditism to persistent cloacae (1-4).

In 1987, Escobar et al. (5) first proposed urorectal septum malformation (URSM) sequence that include absence of anal and perineal openings, ambiguous genitalia and renal anomalies. In 1997, they reported thirteen additional urorectal septum malformation sequence cases (6). Twenty five cases were recently reported by Wheeler and Weaver (11).

In this paper, we present a patient who has clinical findings similar to URSM sequence.

Case report

An infant was born by cesarean section to a 33-year old mother at 32 weeks of gestation. Apgar scores were 3 at the 1st minute, 5 at the 5th minute. At birth, the baby had respiratory distress requiring endotracheal intubation. The baby died after seven hours due to pulmonary insufficiency. The pregnancy was complicated by severe oligohydramnios; narrow rib cage and lower limb anomaly were noted during ultrasound examination at 24th week. Fetal echocardiography was noted as normal.

No maternal drug exposure, infectious disease, alcohol or parental consanguinity was reported. Hormonal investigations concerning the virilization were normal. The mother had a phenotypically normal male stillborn of 34 weeks gestation previously.

Birth weight and length were 1250 g (10th percentile) and 33 cm (<10th percentile), respectively. Potter face (Fig.1), arthrogryposis multiplex congenita, rocker bottom deformity and imperforate anus were observed on physical examination. There were two umbilical arteries and single umbilical vein. External genitalia had male appearance. Phalluslike structure was small with a blind depression at the tip and scrotum was empty (Fig. 2). No perineal openings were observed (Fig. 3). X-ray showed no sacral abnormality. Chromosomal investigation revealed normal female karyotype, 46, XX.



Figure 1. Potter face of the patient. Epicanthal folds, hypertelorism, low-set ears, small chin.

Postmortem examination showed bilateral lung hypoplasia, anorectal atresia, normal fallopian tubes and ovaries, uterus and vagina. Distal colon opened to the vagina. The kidneys, ureters, renal arteries and bladder were absent.

Discussion

An infant described herein exhibited a specific pattern of developmental abnormalities characterized by Potter face, lower limb deformities, no urethral and perineal openings, lower gastrointestinal anomalies, bilateral renal agenesis and female pseudohermaphroditism.

In a human fetus, the hindgut initially forms a cloacae, which is bound externally by a cloacal membrane composed of ectoderm and endoderm. In the fourth week



Figure 2. Features of lower limb and external genitalia: Arthrogryposis multiplex congenita, rocker bottom deformity, phalluslike structure.



Figure 3. Features of the perineum. No perineal openings

of the fetal age, cloacae begins to be divided into two parts by the urorectal septum that is composed of mesoderm. By the seventh week, the urorectal septum fuses with the cloacal membrane. The result of this migration and fusion is the anterior primitive urogenital sinus and posterior anorectal canal. In the male, primitive urogenital sinus develops into the bladder and the pelvic and penile urethra. In the female, primitive urogenital sinus develops into the bladder, the membranous urethra, and vestibule of vagina. When the urorectal septum unites with the cloacal membrane, the membrane anteriorly becomes the urogenital membrane and posteriorly the anal membrane with the urorectal septum serving as the dividing point. The two membranes rupture late in the seventh week to give rise to the external urogenital sinus and the anus, respectively. In the males, the genital tubercle becomes the penis with the penile urethra formed in part from the urogenital sinus. The inferior one third of the anorectal canal develops from the anal pit that is created from mesenchyme proliferating around the anal membrane. Abnormalities of cloacal septation affect the formation of urogenital sinus and subsequently the normal development of Müller's tubercle and thus the vagina and uterus (5,8,9).

Carpenter and Potter (10) reported 48 cases with renal agenesis in which four cases with female pseudohermaphroditism had no urethral and perineal openings. Escobar et al. (5) have reported six female babies with ambiguous genitalia and developmental anomalies in the urogenital and the lower gastrointestinal tract and lacking urethral and vaginal openings in the perineal region. Each patient had normal female chromosomes and normal adrenal gland function. They have taken this constellation of anomalies to be the result of urorectal septum's insufficient migration or unsuccessful fusion with cloacae membrane and called it the "Urorectal Septum Malformation Sequence".

Lubinsky (11) and, Gardner and Nelson (4) reported female pseudohermaphroditism and associated urogenital and lower intestinal tracts anomalies. They suggested that the existence of a spectrum of caudal defects presumably arises from abnormalities of mesodermal migration and

differentiation in the caudal developmental field. Gardner and Nelson (4) designated this continuum of defects in the cloacal dysgenesis spectrum.

Wheeler et al. (6) reported the findings of 13 new cases of URSM. They accepted that absence of anal and urethral openings in both sexes and no vaginal openings in female as the minimal diagnostic criteria for the diagnosis of the URSM. They showed bilateral renal agenesis in 3 of the 13 cases, unilateral renal agenesis in 6, and dysplastic kidneys in 10.

We believe that the findings of our case including absence of perineal and anal opening, female pseudohermaphroditism, rectovaginal fistula and renal agenesis fit urorectal septum malformation sequence.

References

1. Rabinowitz JG, Pelzman H, Robinson T: Small pelvic outlet associated with underdevelopment of the urinary tract and other anomalies. *Radiology* 101: 629-630, 1971.
2. Lukusa T, Moerman P, Fryns JP: Caudal developmental field defect with female pseudohermaphroditism and VACTERL anomalies. *Genet Couns* 7: 207-212, 1996.
3. Wenstrup RJ, Pagon RA: Female pseudohermaphroditism with anorectal, mullerian duct, and urinary tract malformations: Report of four cases. *Clin Lab Obstet* 107: 751-754, 1985.
4. Gardner RJ, Nelson MM: An association of caudal malformations arising from a defect in the „axial mesoderm“ developmental field. *Am J Med Genet Suppl* 2: 37-44, 1986.
5. Escobar LF, Weaver DD, Bixler D, Hodes ME, Mitchell M: Urorectal septum malformation sequence. Report of six cases and embryological analysis. *Am J Dis Child* 141: 1021-1024, 1987.
6. Wheeler PG, Weaver DD, Obeime MO, Vance GH, Bull MJ, Escobar LF: Urorectal septum malformation sequence: report of thirteen additional cases and review of the literature. *Am J Med Genet* 73: 456-462, 1997.
7. Wheeler P.G., Weaver DD: Partial urorectal septum malformation sequence: A report of 25 cases. *Am J Med Genet* 103: 99-105, 2001.

8. Van Allen MI: Congenital disorders of the urinary tract. In: Emery and Rimoin's Principles and Practice of Medical Genetics. Rimoin DL, Connor JM, Pyeritz RE (eds). Churchill Livingstone 1997, pp: 2611-2641.
9. Danish KR, Dahms TW. Abnormalities of sexual differentiation. In: Neonatal-Perinatal Medicine Diseases of the Fetus and Infant. Fanaroff AA, Martin RJ (eds). (6th ed). Mosby 1997, pp: 1500-1547.
10. Carpenter P, Potter E: Nuclear sex and genital malformations in 48 cases of renal agenesis with special reference+ to nonspecific female pseudohermaphroditism. Am J Obstet Gynecol 78: 235-258, 1959.
11. Lubinsky MS: Female pseudohermaphroditism and associated anomalies. Am J Med Genet 6: 123-136, 1980.

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