

Prenatal Diagnosis of Severe Fetal Renal Pelvic Dilatation and Treatment with Double Pig Tail Catheter

Ricardo J Hernandez H*, Mauro Alberto Ochoa Torres and Rene Ramos Gonzalez

Fetal Medicine Department, Hospital Gineco-Obstetricia Dr. I. Morones, Instituto Mexicano del Seguro Social Ave. Constitución y Félix U. Gómez s/n. CP 64000. Monterrey N.L., México

Abstract

Introduction: Fetal urinary tract obstructions require fetio-amniotic shunting with percutaneous vesico centesis or Double Pig Tail Catheter (DPTC) draining fetal urine to the amnion, mainly used to treat low urinary tract obstructions and though is associated to high morbidity; if it is early applied maintains permeable the urinary tract, prolongs fetal life and prevents maternal complications. There are few fetal patients with upper urinary tract obstructions treated by DPTC reported. We report a fetal patient with severe upper urinary obstruction due to ureteric-pelvic stenosis, derived to amnion with a DPTC.

Case: A 19 years old women with 30 weeks of gestation was sent with diagnosis of an abdominal giant cystic in the fetus. The Ultrasound (US) confirmed the presence of a cystic abdominal mass of 10 cm by 10 cm, associated to left renal dilatation, the right kidney was ectopic and dilated forming the cystic mass secondary to an upper urinary tract obstruction, the bladder was normal displaced to the left. An US guided insertion of a DPTC was successfully done at 32 weeks of gestation. The pregnancy ended at 37 weeks with a 2,600 g female newborn, without abdominal cyst and normal creatinine. A follow up by the Pediatric Surgical Department until 18 months old observed normal serum creatinine levels.

Conclusion: A successful installation of a DPTC in a 32 weeks of gestation fetus released a severe upper urinary tract obstruction maintaining permeable after borne.

Keywords: Double pig tail catheter; Renal pelvic-amnion derivation

Introduction

Renal pelvic dilatation is a fetal abnormality commonly detected at the 20th gestation week, although mild pyelectasis may have spontaneous resolution about 10% of moderate or severe require postnatal surgery [1]. Intrauterine fetal-amniotic shunting is a viable treatment alternative for these patients. We report here a rare case of severe pyelectasis with fetal hydronephrosis successfully treated by fetio-amniotic shunting.

Case Report

Obstetric history: This was the second pregnancy from a 19 year-old mother, she had no family history of urinary or renal anomalies, nor have suffered infections or have been exposed to teratogenics or heavy metals. The first contact was done at 30 weeks of gestation, with diagnosis of a fetal abdominal cystic tumor of unknown origin detected in a female fetus with normal amniotic fluid index, parietal diameter, cephalic circumference and femur length, all matched for 29-30 weeks of gestation. The cystic intra-abdominal structure measured 10 cm×10 cm located in the pelvic and middle abdominal areas. The giant cyst compressed bladder and produced mild left kidney dilatation, and belonged to the right kidney that was in ectopic position with severe pyelectasis. The diaphragm showed important thoracic compression and right heart position (Figure 1). A decompressive cyst puncture was offered at 32 weeks of gestation to obtain cystic fluid, ameliorate abdominal and thoracic compression and to evaluate kidney functionality. Fluid analysis confirmed the presence of fetal urine, a diagnosis of a severe Upper Urinary Tract Obstruction (UUTO) due to ureteric-pelvic stenosis in the right kidney was disclosed, and a fetio-amniotic shunting with a Double Pig Tail Catheter (DPTC) was proposed to avoid new fluid production and to ameliorate thoracic compression, being approved by the parents. The procedure was guided with a 5 MHz frequency transducer of Power Vision 6000 Ultrasound (US) with sterile technique, without fetal nor maternal sedation. The fetal renal puncture was realized with a 4 Fr and 15 cm long throrcar and after partial cystic fluid extraction a DPTC was inserted, living the

first end at the renal pelvic cavity, pulling the catheter until second end was in the amnion. The fetal cardiac frequency was monitored during and after the procedure. The mother was discharged from the hospital 48 hours after the intervention, previous demonstration of no uterine activity, infection and catheter permeability and fetal viability.

Previous to delivery, the US showed a normal amniotic fluid index



Figure 1: Severe renal pelvic dilatation secondary to uretero-pelvic stenosis, at the moment of fluid extraction and inserted a double pig tail catheter using prenatal ultrasonography.

***Corresponding author:** Ricardo J Hernández H, Padre Mier 146, Centro Monterrey, NL., México, Tel: 0448113246119; E-mail: richdzher@hotmail.com

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Figure 2: Double pig tail catheter.



Figure 3: Abdomen X-Ray shows the double pig tail catheter with contrast. The inner end is in the right renal pelvis and outer end in the skin.

with no new cyst formation and a normal bladder after applying DPTC. The pregnancy ended at 37 weeks of gestation by cesarean section obtaining a 2,600 g female newborn with Apgar scores of 7-8 at one and five minutes, the length was 48 cm and the cephalic circumference 32 cm, without external malformations, but a short thorax and edematous limbs and genitalia; no syndrome features were observed and had a normal bone evaluation. The karyotype reported a normal: 46XX and serum creatinine levels were normal, suggesting a normal left kidney. The neonate received oxygen therapy until the third day of life. The DPTC is seen in Figures 2 and 3 shows DPTC with contrast permeable in an abdominal oblique X-ray, in Figures 4 and 5 is the patient with DPTC and previous to hospital discharge.

Discussion

Kidney and urinary tract anomalies occur frequently and some of them are associated to bad prognosis and high perinatal mortality. Fetal urinary obstruction is easily detected prenatally by US, mostly are mild (80%), and the rest moderate or severe; of these last, 1/3 requires surgical treatment [2-4]. Other urinary tract abnormalities are ureteropelvic junction obstructions and Low Urinary Tract Obstruction (LUTO) that can be associated with urethral obstruction producing cystic renal dysplasias, abnormal renal function, pulmonary hypoplasia and positional limb anomalies [5,6]. LUTO without treatment has 45% mortality, but one third of those who survives the neonatal period develop chronic renal failure requiring dialysis or renal transplant [7-9].

The obstetric US screening has increased fetal anomalies detection and prenatal diagnosis of urinary tract anomalies that can be treated in

uterus improving prognosis. In the presence of a giant cyst associated to the urinary tract, fluid extraction and analysis allows confirming diagnosis and the amnion-infusion is useful to evaluate fetal structures before performing fetal treatment. When fetal invasion is decided the most common method used is a DPTC under US guide by a percutaneous vesico-amniotic shunting used for LUTO [10]. In this patient we used a DPTC for severe ureteropyelic stenosis and resolved the thoracic compression mass effect. Since urinary obstructions (UO) accounts for up to 60% of all pediatric renal transplants is imperative to treat as early as possible to improve prognosis [11]. Urinary derivation for fetal obstructive anomalies is still controversial [12,13]. Indication for shunting is to avoid compression of normal tissue by cystic structures, but a high complication rate restricts the application of drainage to selected cases [14]. While some reports reached only 60% benefits from foeto-amniotic shunting, other methods like fetal cystoscopic treatment are to be proved beneficial to prolong the life expectancy [15,16].

UO are at high risk for renal failure, but it has been reported that this condition can be reversible; we think that if there exists any chance of renal function recovery in postnatal period after urinary surgery, there should be a hope for prenatal invasion in selected cases, and the more early detection and treatment, the better. With this case we report a patient with an upper renal obstruction treated by foeto-amniotic shunting born with normal serum creatinine.

Conclusions

A successfully in-uterus DPTC foeto-amniotic shunting was applied



Figure 4: Right sided abdominal wall catheter eliminating urine.



Figure 5: Patient previous to hospital discharge, without respiratory distress and thoracic shortness.

at 32 weeks of gestation to release a severe renal pelvic unilateral dilatation and diminishing thoracic compression, in a fetus with UUTO, and kept permeable after born.

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