

## Spontaneous Peri-Nephric Urinoma in a Neonate

Sivasankar Jayakumar\* and Alison Moore

Department of Neonatology, Royal Shrewsbury Hospital, Shrewsbury, West Midlands, UK

\*Corresponding Author: Sivasankar Jayakumar, Department of Neonatology, Royal Shrewsbury Hospital, Shrewsbury, West Midlands, UK.

Received: February 18, 2019; Published: March 26, 2019

### Abstract

Peri-nephric urinoma is a fluid mass formed due to extravasation of urine surrounding the kidney. In neonates, usually obstruction to the urinary outflow tract leads to the rupture of the pelvi-calyceal system and subsequent formation of a peri-nephric urinoma. Very rarely a peri-nephric urinoma is formed without an underlying structural obstruction to the urinary outflow tract. We report a case of unilateral peri-nephric urinoma in a female neonate without any evidence of obstructive uropathy or associated pathology. We reviewed the literature and to the best of our knowledge no such case has been reported so far.

**Keywords:** *Urinoma; Peri-Nephric Urinoma; Neonate*

### Introduction

Peri-nephric urinoma is a fluid mass formed due to extravasation of urine surrounding the kidney. In neonates, usually obstruction to the urinary outflow tract leads to the rupture of the pelvi-calyceal system and subsequent formation of a peri-nephric urinoma.

### Case Report

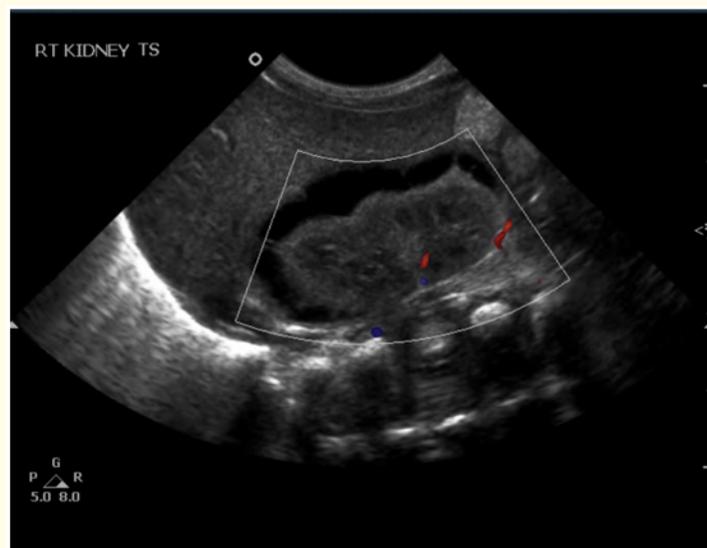
A 47-year-old mother underwent fertility investigations and conceived an *in-vitro* fertilisation pregnancy with triplets. Triplet 1 was a singleton and triplets 2 and 3 were monozygotic, diamniotic twins. At 28 weeks of gestational age, a twin-to-twin transfusion was noted with triplet 2 as the identifiable donor and triplet 3 as the recipient. Four amnioreductions were performed on triplet 3 without any complications. Antenatal scans (last scan 4 days prior to delivery) did not reveal any structural abnormality in this triplet. In view of progressive twin-to-twin transfusion a semi-elective caesarean section was performed at 29+6 weeks of gestational age and the triplets delivered.

Triplet 3 was a girl and weighed 1290 gms. She required intubation and ventilator support at birth initially, but was extubated to continuous positive pressure ventilation [CPAP] at 12 hours of age. Renal function tests at 24 hrs of age revealed high serum creatinine of 130 micromol/L, which continued to rise to 240 micromol/L the following day. The patient had a good diuresis despite high creatinine. Abdominal examination was unremarkable. Urine and plasma sodium and other electrolytes were within normal range. The serum creatinine levels started falling down on day 3 with fluid restriction only and normalised within a few days. However a renal ultrasound on day 4 showed retroperitoneal fluid collection surrounding the right kidney with preserved renal architecture (Figure 1). The localised fluid collection surrounding the kidney was clear and suggestive of urine. There was no free fluid found within the peritoneal cavity and the left kidney appeared normal.



**Figure 1:** Ultrasound image of the Right kidney of our patient on day 3 of life showing a rim of clear peri-nephric fluid with normal renal architecture.

She was started on prophylactic antibiotics and the fluid collection was monitored regularly with weekly renal ultrasound scans. Renal ultrasound scans showed increasing amount of fluid surrounding the kidney along with progressive loss of renal architecture (Figure 2). The serum creatinine remained normal at 7 weeks of age. A renal MAG3 scan revealed a non-functioning right kidney, but an adequately functioning left kidney. A micturating cysto-urethrogram (MCUG) at 8 weeks did not reveal any vesico-ureteric reflex or bladder outlet obstruction. Subsequent renal ultrasound scan at 9 weeks of age revealed markedly shrunken right kidney with no surrounding fluid. The patient was clinically well with normal serum creatinine levels and remains normotensive so far after 5 month follow-up.



**Figure 2:** Ultrasound image of the Right kidney of our patient on day 11 of life showing large amount of peri-nephric fluid with loss of renal architecture.

## Discussion

Urine can extravasate from the kidney and can present in the form of a localised collection or ascites or rarely as pleural effusion [1,2]. A peri-nephric urinoma is a localised fluid mass formed by extravasated urine surrounding the kidney. The factors influencing its formation are (1) existing renal malfunction; (2) an underlying obstruction; and (3) rupture of the collecting system [3]. Pelvi-ureteric junction [PUJ] obstruction and posterior urethral valves [PUV] are the most common etiologies of structural urinary outflow obstruction in a neonate, however the obstruction could be anywhere in the urinary tract.

An expanding peri-nephric urinoma localised within the retroperitoneal space can exert pressure on the kidney or leak into the peritoneal cavity producing urinary ascites. Adzick, *et al.* examined the effect of fetal urinary extravasations on the developing kidney in 12 fetuses taken from a series of 44 cases of fetal urinary tract obstruction. They concluded that fetal urinary ascites appears to ameliorate obstruction-induced renal dysplasia and conversely, peri-nephric urinomas that do not decompress are associated with renal dysplasia [4].

In neonates, the differential diagnosis of a peri-nephric urinoma can include hydronephrosis, cystic renal disease, cystic renal tumours, and duplication of intra-renal collection system. Multi cystic dysplastic kidney [MCDK] is the most common cystic renal disease in children and is characterized by tense, non-communicating cysts and absence of functioning renal parenchyma [5]. A multilocular cystic renal tumor is a very rare tumor of the neonatal kidney where an ultrasound scan may show cystic areas between solid areas that are circumscribed by a thick capsule [5]. Although, antenatal ultrasound scan in a pre-term triplet pregnancy pose challenges in diagnosing a fetal renal abnormality, multiple serial antenatal ultrasound scans have been done regularly on our patient and it is unlikely that all the scans have missed a hydronephrosis. The antenatal and postnatal scans in our patient revealed a normal renal architecture and no cystic renal lesions were noted.

Unable to explain, the urinoma formation in our patient, we searched the literature to find if peri-nephric urinoma occurred spontaneously. Pubmed Medline was accessed using the keywords: "urinoma" and "neonate" and limits to English, humans, and newborn (0 - 1 month). A total of 43 articles were found. Of these 26 were individual case reports and reviews, 7 were observational studies and 2 systematic reviews. Remaining 8 were irrelevant to peri-nephric urinoma in a neonate. All of the 7 observational studies included patients with demonstrable obstructive uropathy with and without urinoma.

Most of the case reports included patients with posterior urethral valves. Only 7 out of the 26 case reports on urinoma had no demonstrable obstructive uropathy. Among these 7 case reports; three were reported on renal fungal ball/abscess leading to rupture and urinoma formation [6-8]. Miller, *et al.* reported a case following the performance of a "bloody tap" amniocentesis [9]. The amniocentesis performed in our patient was uneventful unlike the case reported by Miller, *et al.* Reinberg, *et al.* reported a case after credé manoeuvre in a girl with neurogenic bladder [10]. Cimador, *et al.* reported a case on vesico-ureteric reflex but with no demonstrable obstruction [11]. Ito, *et al.* reported a case where the left kidney was absent and the right dysplastic without any demonstrable obstruction [12].

Certainly, with normal antenatal scans and a preserved normal renal architecture postnatally as seen on day 4 ultrasound scan and without any evidence of structural obstruction, it is not clear what caused the peri-nephric urinoma in our patient. It is possible that the urinoma seen in our patient could be the result of trauma during delivery. Our patient was delivered by a semi-elective caesarean section and was the last baby to be delivered. It would be difficult to say if such an event occurred in our patient at the time of birth. Nevertheless, the cause of peri-nephric urinoma in our patient remains unknown.

## Conclusion

The exact etiology behind the unilateral peri-nephric urinoma in our patient is unclear. Spontaneous rupture of the pelvic-calyceal system or renal parenchyma during the perinatal period seems to be the most likely cause of the urinoma in our patient. Although, traumatic injury to pelvi-calyceal system should also be considered in cases of peri-nephric urinoma without any evidence of obstructive uropathy, it is clear that postnatal ipsilateral renal function remains poor and is unlikely to improve subsequently.

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**Volume 8 Issue 4 April 2019**

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