

Case Report**Incidental Finding of Bilateral Ureteropelvic Junction Obstruction in a Patient with Sports Related Blunt Force Traumatic Renal Injury**

Dr. Akinwumi A. Akinbodewa^{*1}, Mr. Isaiah Akingbesote², Dr. Ayo O. Ogunsemoyin³, Dr. Oluseyi A. Adejumo¹, Dr. Sunday O. Ogundiniyi⁴, Dr. Adejoke Joseph⁵ and Dr. Olabode O. Omomunijoye⁵

¹Department of Medicine, University of Medical Sciences Teaching Hospital, Ondo State, Nigeria

²Department of Dental Surgery, University of Medical Sciences Teaching Hospital, Ondo State, Nigeria

³Department of Radiology, University of Medical Sciences Teaching Hospital, Ondo State, Nigeria

⁴Department of Surgery, University of Medical Sciences Teaching Hospital, Ondo State, Nigeria

⁵Department of Microbial Pathology, University of Medical Sciences Teaching Hospital, Ondo State, Nigeria

*Corresponding Author
Dr. Akinwumi A. Akinbodewa

Article History

Received: 20.07.2022

Accepted: 30.07.2022

Published: 10.08.2022

Citations:

Akinwumi A. Akinbodewa, Isaiah Akingbesote, Ayo O. Ogunsemoyin, Oluseyi A. Adejumo, Sunday O. Ogundiniyi, Adejoke Joseph & Olabode O. Omomunijoye. (2022); Incidental Finding of Bilateral Ureteropelvic Junction Obstruction in a Patient with Sports Related Blunt Force Traumatic Renal Injury. *Hmlyn Jr Med Surg*, 3(4) 58-61

Abstract: Ureteropelvic junction (UPJ) obstruction is the most common form of Congenital Anomaly of the Kidney and Urinary Tract UPJ and may remain asymptomatic in some cases with eventuation in end stage renal disease later in life. In this case report, we discuss the incidental finding of progressive, asymptomatic bilateral ureteropelvic junction obstruction and deranged serum creatinine in a 24 years old male who developed severe left loin pain and haematuria following a blunt force traumatic injury during a football game. It is advised that sports students should undergo renal/urogenital systems evaluation and all close-range football shots to the abdomen and blows to the abdomen or lower back should be thoroughly investigated among other recommendations.

Keywords: ureteropelvic junction obstruction, renal trauma, football injury, Nigeria.

INTRODUCTION

Despite being the most popular sport in Nigeria, football contributes insignificantly to the burden of abdominal injuries presenting to the hospital (Asuquo, M. *et al.*, 2012). In one prospective study, 15 sports-related kidney injury were reported over 8 years (with one resulting in nephrectomy) among children aged 13-17 years. Thirteen cases of injury (86.7%) were suffered by boys with only 5 (33.3%) due to football. However, when it does occur, it could be a potentially debilitating problem with costly loss of time off the football field and socio-economic life. As a matter of fact, cases of kidney lacerations are now being touted as the next concussion story (Asuquo, M. *et al.*, 2012; Mitchell, L. 2015).

Ureteropelvic junction (UPJ) obstruction is the most common form of Congenital Anomaly of the Kidney and Urinary Tract (CAKUT) which commonly presents as neonatal and antenatal hydronephrosis, occurring in 1:1,500 live births with a male to female ratio of 3-4:1. The left kidney is generally more commonly affected than the right and is bilateral in about 10% of cases (Grasso, M. 2022). It is more common among children but not necessarily rare in adults (Klein, J. *et al.*, 2011).

UPJ obstruction is the main cause of end stage renal disease in children (Benfield, M. R. *et al.*, 2003). However, in some cases, asymptomatic UPJ obstruction may be discovered at older age incidentally when radiology investigations are performed when investigating other diseases (Wiener, J. S. 2020). In this case, we discuss the incidental discovery of asymptomatic bilateral UPJ obstruction in a young male who developed left loin pain and haematuria following a blunt force traumatic injury during a football game.

CASE REPORT

A 24 year old medical student presented to the Kidney Care Centre on February 11, 2022 at 9:30am with 4 episodes of haematuria. He sustained a blunt abdominal injury while playing amateur University football tournament at approximately 6pm a day earlier. A leather ball weighing between 250 and 400mg was kicked to his left mid region at close range, from an approximate distance of 6 meters.

Thereafter, he developed severe, colicky left flank pain followed by passage of bloody urine after about 2 hours. There were no clots in the urine. There was no associated weakness, dizziness or fainting and no nausea, vomiting, haematemesis or haematochaezia. He was not on any form of anticoagulant or antiplatelet medication. The football was standard diameter leather ball weighing approximately 250-400mg.

He was conscious and not pale but in acute painful distress. His vital signs were stable with temperature 36.9°C, systolic blood pressure range 110-160mmHg, diastolic blood pressure range 60-90mmHg and pulse rate of 70-90bpm. There was left loin tenderness. There

was no abdominal swelling, organomegaly or ascites. There was no reduction in urine output as indicated:

Day 1 input/output chart: 4,100/2,800ml in 24 hours

Day 2 input/output chart: 6000/2,600ml in 24 hours

Urine microscopy showed numerous red blood cells with normal morphology, absence of casts and crystals, few epithelial cells and yeast cells. As shown in figure 1, Computerized Axial Tomography scan of the abdomen showed bilateral pelviureteric junction obstruction with grade 2 right hydronephrosis and grade 4 left sided hydronephrosis in accordance to the staging by Onen (Onen, A. 2020).



Figure 1: Computerized axial Tomography scan showing bilateral hydronephrosis

The renal function parameters and urine studies during the period of care are as shown in table 1.

Table 1: Laboratory parameters of our index case

Parameters	Day 1	Day 11	Day 37	Day 62
Creatinine (umol/L)	198	132	149.3	109.5
Urea (mmol/L)	4.8	3.5	Not repeated	Not repeated
Sodium (mmol/L)	135.2	148	Not repeated	Not repeated
Potassium (mmol/L)	4.7	3.2	Not repeated	Not repeated
Urine SG	Bloody urine	Not repeated	1.015	1.010
Urine pH	Bloody urine	Not repeated	6.0	6.0
Urine microscopy	Bloody urine	Not repeated	Amber, clear, 1-2pus cells/hpf, no red blood cells	

He was placed on intravenous infusion, parenteral paracetamol, hyoscine butylbromide and per os dicynone. The urine and packed cell volume were monitored serially with anticipatory grouping and cross matching of blood. The urine colour began to lighten up after 24 hours post injury and became clear after 96 hours of treatment. Patient was discharged to the renal and urology clinics on oral analgesics and haematinics, intake of 4-5 litres of water per os daily, self-monitoring of urine volume and colour and avoidance of sports and other strenuous activities. He is currently scheduled for corrective surgery.

DISCUSSION:

Kidney injury from sport could result from prolonged, vigorous physical exertion, contusion or laceration from a blunt force. Our index patient is a

young male who had been living unawares with asymptomatic UPJ obstruction until he sustained contusion injury secondary to a severe blunt trauma to his left kidney during a football match. The injury occurred from the force of a leather football weighing 250-400mg travelling through a short distance of about 6 metres. This could be compared to a direct kick to the kidney. Studies have shown that renal injury can occur from a kick to the abdomen or from a blow delivered to the lower back (Asuquo, M. *et al.*, 2012; Barrett, C., & Smith, D. *et al.*, 2012).

Our patient’s presentation was mild with non-clotting haematuria and left flank pain which lasted only 96 hours as well as stable vital signs. However, literature has shown that depending on the severity and mechanism of injury, clinical features could include

nausea, vomiting, bruising, hypotension, proteinuria and sore muscles occurring from intense exercise (NATA, 2012). Indicators of severe renal injury include but not limited to the following; haematuria, hypotension, presence of flank haematoma, abdominal or flank tenderness, rib fractures and penetrating injuries to the low thorax or flank (Alsikafi, N. F., & Rosenstein, D. I. 2006).

The tests we conducted were minimal and focused considering that in Nigeria, patients still pay out of pocket and fortunately, the history and physical examination already indicated a mild renal injury. Normally, the battery of tests should include urinalysis, urine microscopy, complete blood count, electrolytes, liver function tests, creatinine, glucose, amylase, lipase, Human Chorionic Gonadotrophin, plain radiograph, renal ultrasonography and contrast-enhanced CAT scan (Brophy, R. H. 2008; Wegner, S. *et al.*, 2006).

It should be noted that absence of haematuria does not exclude renal injury. This much has been shown by Santucci, R. A., & McAninch, J. W. where about 4% of 2,500 patients who were confirmed to have traumatic renal injury presented without haematuria Santucci, R. A., & McAninch, J. W. (2000). All serious trauma to the abdomen must be taken seriously; urine of such victims must be checked for microscopic haematuria and where present, further investigations to rule out renal injury must be followed through.

Until the injury, there was no clinical indication of UPJ obstruction in our patient. Already in his fourth year as an undergraduate, there was no documented baseline serum creatinine for him since admission; neither was there any pretournament clinical evaluation for him or any of his team mates by the school health centre. This is similar to the work by Brophy, R. H. *et al.*, where one player with congenital hydronephrosis was found among a group of professional American football team only during medical care m (Brophy, R. H. *et al.*, 2008). It is therefore advisable for would-be amateur football team mates should undergo routine medical screening which can reveal more sinister urogenital problems such as single kidneys and large multiple renal cysts etc.

CAT scan was useful in excluding laceration and renal rupture in this case. It was also very useful in the incidental finding of UPJ obstruction. Generally CAT scan is the recommended diagnostic tool in suspected traumatic kidney injury. Aside diagnosis of UPJ obstruction, the extended use of CAT scan include identification of the causes of acquired UPJ obstruction such as retroperitoneal fibrosis, retroperitoneal lymphadenopathy, retroperitoneal mass, freely mobile kidney, ureteral wall scarring, peri-ureteral scarring and bilateral ureteric tumours (Pilch, K. *et al.*, 2016).

There is no consensus to date on stopping individuals with structural kidney diseases from sporting activities. For example, opinions differ among Nephrologists regarding keeping away patients with a solitary kidney (congenital or post-transplantation) from sports completely. More so, the risk of losing a kidney from contact sport remains low (Bernard, J. J. 2009; Anderson, C. R. 1995).

We hereby recommend that students who play football (and other contact sports by extension) at all academic levels should undergo proper medical screening to include full renal evaluation. Close-range football shots and blows to the abdomen or lower back should be thoroughly investigated. Footballers should undergo routine annual medical checks to determine previously unnoticed new medical events. Pregnancy scans should include a detailed protocol for the detection of UPJ obstruction (and other CAKUT) as UPJ obstruction in particular can be detected by antenatal ultrasound in the 2nd trimester (Jackson, L. *et al.*, 2018).

REFERENCES:

1. Asuquo, M., Nwagbara, V., Umoh, M., Ugare, G., Agbor, C., Japhet, E., & Ikpeme, A. (2012). Blunt abdominal trauma in a teaching hospital, Calabar, Nigeria. *Int J Clin Med*, 3, 693-696.
2. Mitchell, L. (2015). Football and kidney lacerations. *Health University of Utah. healthcare.utah.edu*. November 12, 2015. Accessed on April 29, 2022
3. Grasso, M. (2022). Ureteropelvic junction obstruction. *Medscape. emedicine.medscape.com*. Accessed on April 30, 2022
4. Klein, J., Gonzalez, J., Miravete, M., Caubet, C., Chaaya, R., Decramer, S., ... & Schanstra, J. P. (2011). Congenital ureteropelvic junction obstruction: human disease and animal models. *International journal of experimental pathology*, 92(3), 168-192.
5. Benfield, M. R., McDonald, R. A., Bartosh, S., Ho, P. L., & Harmon, W. (2003). Changing trends in pediatric transplantation: 2001 annual report of the North American Pediatric Renal Transplant Cooperative Study. *Pediatr. Transplant*, 7, 321-335.
6. Wiener, J. S. (2020). Congenital ureteropelvic junction obstruction imaging and diagnosis. *emedicine.medscape.com*. Accessed on April 30, 2022.
7. Onen, A. (2020). Grading of hydronephrosis: an ongoing challenge. *Frontiers in pediatrics*, 8, 458. Doi: 10.3389/fped.2020.00458
8. Barrett, C., & Smith, D. (2012). Recognition and management of abdominal injuries at athletic events. *International Journal of Sports Physical Therapy*, 7(4), 448-451.
9. National Athletics Trainer's Association (2012). Injury surveillance database on sports related kidney injury. *Pediatrics*, 130, e40.

10. Alsikafi, N. F., & Rosenstein, D. I. (2006). Staging, evaluation, and nonoperative management of renal injuries. *Urologic Clinics*, 33(1), 13-19.
11. Brophy, R. H., Gamradt, S. C., Barnes, R. P., Powell, J. W., DelPizzo, J. J., Rodeo, S. A., & Warren, R. F. (2008). Kidney injuries in professional American football: implications for management of an athlete with 1 functioning kidney. *The American Journal of Sports Medicine*, 36(1), 85-90. DOI: 10.1177/0363546507308940
12. Wegner, S., Colletti, J. E., & Van Wie, D. (2006). Pediatric blunt abdominal trauma. *Pediatric Clinics*, 53(2), 243-256.
13. Santucci, R. A., & McAninch, J. W. (2000). Diagnosis and management of renal trauma: past, present, and future. *Journal of the American College of Surgeons*, 191(4), 443-451.
14. Pilch, K., Jaźwiec, P., Truskiewicz, K., & Gać, P. (2016). Computed tomography imaging in ureteropelvic junction obstruction--case report. *Przegląd Lekarski*, 73(1), 49-51.
15. Bernard, J. J. (2009). Renal trauma: evaluation, management, and return to play. *Current Sports Medicine Reports*, 8(2), 98-103.
16. Anderson, C. R. (1995). Solitary kidney and sports participation. *Archives of Family Medicine*, 4(10), 885-888.
17. Jackson, L., Woodward, M., & Coward, R. J. (2018). The molecular biology of pelvi-ureteric junction obstruction. *Pediatric Nephrology*, 33(4), 553-571.