

Trauma Of Pathological Kidney About 13 Cases And Literature Review

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Abstract: The aim of this work is to record the acquired or congenital uropathy diagnosed during kidney injury and to evaluate their diagnostic, prognostic and therapeutic aspects. We report a retrospective study of 13 cases (14%) of renal trauma on pathological kidney from a total of 93 observations of renal trauma collected at Department of Urology A in the University Hospital Ibn Sina Rabat, between January 2002 and January 2014. It is often a road accident in 8 cases (61.5%). The underlying uropathy is dominated by urolithiasis in 6 cases (46.1%); pelvi-ureteric junction in 3 cases (23.1%), followed by kidney tumors in 2 cases (15.4%), and cystic kidney disease in 2 cases (15.4%). Therapeutically, 2 patients (15.3%) were investigated in emergency for hemodynamic instability involving life-threatening. The other 11 cases received conservative attitude based on clinical and radiological monitoring by computed tomography (CT). The selective embolization of arterial lesions or drainage of the urinary tract were performed according to indication. Etiological treatment was performed after an average of 113 days. The therapeutic approach should be conservative. The current trend is to drain the urinary tract in the acute phase and then propose a late etiological treatment.

Key words : Renal injury; Pathological kidney; Diagnosis; Conservative treatment; Etiological treatment.

1 INTRODUCTION:

Traumas are the most common cause of death in young adults. In urology, kidney is the organ most frequently affected. The trauma of acquired or congenital uropathy is a rare and singular entity. Indeed, kidney weakened by the underlying lesion is more vulnerable to shocks of low intensity. The aim of this retrospective study argued by a systematic review of the literature is to record urological lesions diagnosed incidentally at the waning of the balance sheet for renal trauma and to assess diagnostic, prognostic and therapeutic aspects,

2 PATIENTS AND METHODS:

We report a retrospective study of 13 cases of renal trauma on pathological kidney collected at the Department of Urology A in the University Hospital Ibn Sina of Rabat, between January 2002 and January 2014. During the same period, 93 cases of closed renal trauma have been hospitalized in our department. Various parameters were taken into account including: age, sex, affected side, traumatic mechanism, uropathy coexisting, clinical signs and radiological assessment for trauma staging. Management in the acute phase of trauma, uropathy treatment and operative delay was the objects of our analysis. Finally, complications occurred were recorded. After the release, clinical, biological and radiological follow-up was performed using ultrasound, computed tomography (CT) or indication according to renal scintigraphy of DMSA (dimercaptosuccinic acid).

3 RESULTS:

Our patients are between 18 and 76 years with a mean age of 36.3 years and a peak incidence between 20 and 35 years (10 patients or 77%). In addition, 10 patients were male and the rest were female, giving a sex ratio of 3.3. The etiology of these injuries is dominated by road accidents in 8 cases (61.5%); brawls in 3 cases (23.1%) and professional or domestic falls in 2 cases (15.4%). The right side is most frequently achieved: 10 cases (77%). Eight patients presented to the emergency room within 12 hours after trauma and the remaining five were consulted between the first and third day after trauma. The clinical features were dominated by hematuria. It was found in 11 cases (84.6%). The pain is very variable. It is type of back pain and more rarely renal colic related to migration of blood clot in the urinary tract. It is present in all our patients. The hemodynamic instability not responding to filling was encountered in 3 cases (18.75%). The lumbar fossa examination found defense in 6 patients (37.5%); ecchymosis in 4 patients (25%); and a mass giving the lumbar contact bimanual palpation in 2 cases (15.3%). Radiological explorations allow better diagnostic approach with a good assessment of renal status. Thus, eleven of our patients were investigated by ultrasound followed by CT urography (vascular, parenchymal and late phases) the same day of admission to the emergency. Diagnostic and therapeutic arteriography was performed twice between 36 and 72 hours after trauma. Only two patients were surgically explored immediately without prior radiological examinations because of the severe hemodynamic shock. The radiological assessment has enabled to assess kidney damage, to determine their severity and diagnose the type of the underlying uropathy. We classified our patients into 5 grades according to the classification of the American Association for the Surgery of Trauma (AAST) (Table 1 and 2). We noted in our series a predominance of severe kidney injury (grades III, IV and V of the AAST) in 7 cases corresponding to 53.8%. The etiology of pathological kidney present before the trauma is dominated by nephrolithiasis in 5 cases (38.4%). Ureteropelvic junction syndrome (UPJS) is also common with 3 cases (23%), followed by kidney tumors and cystic kidney disease (Table 3).

Table 1 – Kidney injury scale according to the AAST (American Association for the Surgery of Trauma).

Grade	Type of injury	Description of injury
I	Contusion	Microscopic or gross hematuria, urologic studies normal
	Hematoma	Subcapsular, nonexpanding without parenchymal laceration
II	Hematoma	Nonexpanding perirenal hematoma confirmed to renal retroperitoneum
	Laceration	<1.0 cm parenchymal depth of renal cortex without urinary extravagation
III	Laceration	<1.0 cm parenchymal depth of renal cortex without collecting system rupture or urinary extravagation
IV	Laceration	Parenchymal laceration extending through renal cortex, medulla, and collecting system
	Vascular	Main renal artery or vein injury with contained hemorrhage
V	Laceration	Completely shattered kidney
	Vascular	Avulsion of renal hilum which devascularizes kidney

Table 2 – Distribution by grade according to the AAST.

Grade	I	II	III	IV	V
Cases	2	4	3	3	1
Percentage proportion (%)	15,4	30,7	23,1	23,1	7,7

Table 3 – Distribution according to etiology

Uropathy	Cases	Percentage proportion (%)
Kidney stones	5	38,4
Ureteropelvic junction syndrome (UPJS)	3	23,1
Cystic kidney disease (1 SSRC et 1 PKD)	2	15,4
Renal tumor (AML)	2	15,4
Hydronephrosis due to ureteral stone	1	7,7

AML: angiomyolipoma; SSRC: Simple serous renal cyst; PKD: polycystic kidney disease.

The radiological assessment was used to assess the impact of the underlying uropathy on the injured kidney and verify the integrity of the contralateral kidney. The traumatized kidney appeared non functional in 2 cases, without enhancement after injection of contrast. The contralateral kidney was normal in 9 cases, lithiasic in 2 cases and compensatory hypertrophy in 2 patients. Therapeutically, two patients (15.3%) were explored surgically because of hemodynamic instability involving life-threatening. The urgent surgical treatment consisted of one nephrectomy for pedicle injury (grade V) and the suture deep parenchymal fractures (grade IV) through which we extracted a pelvic calculation of 3 cm. Histological examination of the piece of nephrectomy revealed renal cell carcinoma conventional (CCRC) localized at the lower pole (4 cm). A conservative approach was indicated for 11 cases of trauma (84.6%). This was based on clinical and surgical abstention with CT surveillance (uroscan control between the sixth and the eleventh day) with the possible use of endourology and interventional radiology. Of these 11 injuries observed, 6 were minor (grades I and II), 3 cases of grade III and 2 cases of grade IV. The underlying uropathy were: 5 kidney stones, 3 UPJS, 2 cystic kidney diseases (simple kidney cysts and polycystic kidney disease), 2 angiomyolipoma (AML), and a ureteral stone (11 mm) with upstream hydronephrosis (Fig. 1, 2, 3 and 4).

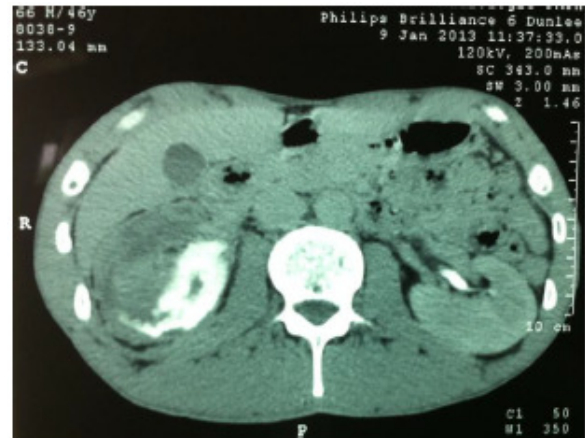


Fig. 1 – Trauma of the right kidney suffering from angiomyolipoma with perirenal hematoma.



Fig. 2 – Trauma of the right kidney containing a simple serous cyst.



Fig. 3 – Left renal trauma grade IV with ureteropelvic junction syndrome (UPJS).

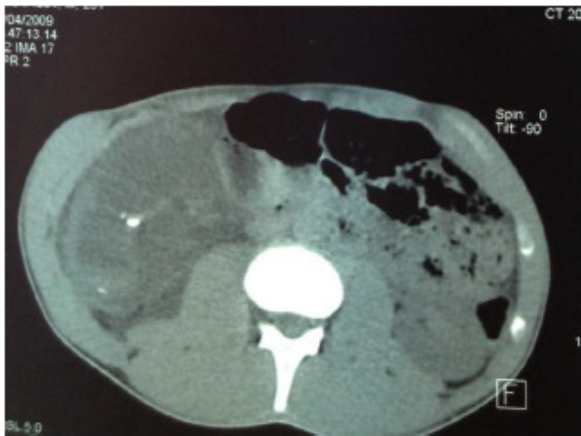


Fig. 4 – Right renal trauma grade II containing multiple calculi of the urinary tract.

Selective embolization was performed in two patients with grade IV injuries, one suffering from AML and the other suffering from a lower calyx lithiasis less than 15 mm. Both embolizations were performed within 72 hours after trauma. Embolization in trauma on AML failed, marked by the reversal of a massive hematuria requiring nephrectomy at sixth day after injury. Drainage by stent type double J was performed in 6 patients with obstruction of the urinary track associated with urohematoma variable abundance. The drainage time was 21 days to 3 months. Three patients underwent ultrasound-guided percutaneous drainage for infected uro-hematoma during 8 to 13 days. All patients underwent a CT scan follow-up: between the tenth and twenty-fifth day after the injury and at 3 months. The outcome was a parenchymal scarring and resorption of uro-hematoma. Etiological treatment was proposed in 7 patients. The average delay before definitive treatment was 113 days (42-247 days). It consisted in 2 plasty of the ureteropelvic junction, 2 nephrectomies, one percutaneous nephro-lithotomy (PCNL) for renal pelvic lithiasis (3 cm), and finally two indications of extracorporeal lithotripsy (ESWL) for urinary calculi (kidney and ureteric lithiasis less than 2,5 cm). Simple kidney cysts and polycystic kidney disease were monitored only. The average follow-up was 6,1 years (6 months to 12 years). There was no mortality even in 2 patients underwent emergency surgery and 2 cases of embolization. Distant suites are marked by: worsening of hydronephrosis after plasty of the ureteropelvic junction, requiring surgical revision by endopyelotomy; lithiasis recurrence in another patient treated by ESWL; and the occurrence of hypertension in 3 patients, medically controlled.

4 DISCUSSION:

Blunt trauma of pathological kidney represent a particular clinical form, little explored by the urological literature. This entity is relatively rare, its frequency varies between 4.5 and 16.5% [1, 2]. Children are most vulnerable taking into account a lower anatomical protection of the renal unit. In our series the rate was 14%. This relatively high figure in our opinion could be explained by two reasons: a few symptomatic or asymptomatic presentation of these diseases and late diagnosis of congenital uropathy in our country [3]. Renal trauma can occur at any age but the

young man between 20 and 40 years is the preferred victim with a frequency ranging from 75 to 80%; this is also the case in our study because 77% of our patients had an age between 20 and 35 years [4]. The literature data on the mechanism of trauma in pathological kidney have reported minor trauma, often domestic or work accidents. The elevation of the pyelic pressure, as described by Schmidlin in a computer model, weakens the kidney by distension and makes it more vulnerable to shocks of low intensity. It is different in our series where 90 % of the injuries have resulted from violent shocks caused by accidents or by brawls, where majority (56%) renal injuries considered serious [5]. We note a clear predominance of reaching the right (77%), very much like the finding of Bahloul, without it being possible to draw much biomechanical considerations [3]. Clinically, macroscopic or microscopic haematuria remains the best indicator of renal trauma; in our series it is found up to 84.6% of cases. However, it may be lacking in nearly one in four, especially in case of pedicle injury or ureteral avulsion. Pain is the second largest call sign. The hemorrhagic shock found 2 times (15.3%) in our series, reflecting the severity of the trauma and injury severity; it's needs surgical exploration without delay [6] The combination of doppler and ultrasound is considered the first-line examination, because of its safety and its availability in emergency. It guides the diagnosis but the interpretation remains delicate because it's operator-dependent. It should never be postponed for an early evaluation by CT. The multislice spiral CT urography is currently the gold standard of diagnosis, assessment and monitoring of renal trauma. It must necessarily include three stages: injection without cuts, vascular and urographic time. Techniques multiplanar reconstructions associated with three-dimensional rendering permit particularly precise morphological analysis. It makes the diagnosis of lesions and parenchymal pedicle, allows accurate staging of trauma, exploring the perirenal area, evaluates the contralateral kidney and finally search for possible associated visceral lesions. The initial CT scan may still underestimate some lesions and the risk of urinary complications, hence the importance of early radiological reassessment between the 3rd and the 10th day post-trauma [7]. The intravenous urography (IVU) dethroned by CT, and usually contributes little and must be resolutely abandoned. His only interest is in achieving a clouding intraoperative for hemodynamically unstable patients who have not received prior CT [8]. For the same reasons, arteriography has so far only two indications: embolization of a distal segmental artery in cases of active bleeding without hemodynamic instability and revascularization of silent kidneys on CT [9]. When trauma occurs in pathological kidney, obstructive cause is mostly found. The two most frequent diagnoses reported in the literature are nephrolithiasis and the ureteric junction obstruction syndrome, they alone account for 61.5% of patients in our series. Other rarer types of conditions can be met: Tumor lesions of the kidney or urinary tract, congenital malformations such as renal pelvic ectopic kidney or the "horseshoe" kidney, more prone to injury because it is not protected by the rib cage and the perirenal fat [3, 10-13]. The committee of the American Association for the Surgery of Trauma (AAST) has developed a classification into 5 grades based on clinical data, CT and prognostic. This

classification practice, reliable and easily reproducible is validated since 2001. It has become the best predictor of surgical exploration. Thus, the V grades have a nephrectomy rate of around 80% according to studies. We always have recourse to renal trauma [14]. Previous series of Bahloul and Giannopoulos report minor injuries on pathological kidney, occurred during low violent shocks such as home or work falls; it was for most of grade I and II. Our study presents a different conclusion but not necessarily contradictory pathological : kidneys weakened by a preexisting lesion, may experience significant dilapidations when subjected to high mechanical stresses (deceleration injuries, violent direct impact) [3, 5, 10]. 38.4% of our patients had a major renal trauma (grades III, IV and V of the AAST). Therapeutic management depends on the nature of the preexisting urologic pathology, and its impact on the occurrence or absence of complications, as well as the degree of renal trauma itself. However, the accurate diagnosis of uropathy coexisting trauma may be difficult during the acute phase before healing [3, 10]. Nowadays, surgical abstention with surveillance is the standard for treatment of closed renal trauma. Only hemodynamic instability and / or the presence of visceral lesions are associated with an absolute indication for urgent surgery. The opening of the renal space is indicated in cases of expanding or pulsatile [15, 16] retroperitoneal hematoma. Two patients investigated urgently to blood pressure instability underwent: One nephrectomy due to parenchymal and pedicular lesions with uncontrollable bleeding and parenchymal suture for deep fractures. In retrospect, these injuries were rated as follows: One patient have grade IV and 2 patients had grade V of the AAST. Lesions of grade III and IV, and even some forms of grades V are now the subject of conservative treatment. This conservative attitude was made possible through advances in endo-urology and vascular interventional radiology [9, 17]. Lazar suggests conservative treatment before trauma of hydronephrosis associated with urinary drainage of the track followed by an etiological treatment distance [18]. We opted for a decidedly conservative approach based on clinico-radiological monitoring with endourological and endovascular treatment. Indeed, concernat young adults to high life expectancy, the preservation of a significant nephron capital is particularly profitable. Regarding the 11 patients monitored (84.6%), drainage of the urinary tract by Double J stent was performed in 6 patients with and obstruction due to urolithiasis and ureteric junction obstruction syndrome. In two patients with grade IV injuries diagnosed on CT, we used twice selective embolization of arterial wounds including one on angiomyolipoma. This voluntary abstainer therapeutic choice has allowed us to have a remarkably low rate of 1 nephrectomy (7.7%) taking into account the severity of lesions observed. This result is compared to the series of Bahloul, who had a surgical attitude before 1995 with a rate of 45% nephrectomy [3]. However the failure of embolization, requiring nephrectomy for massive bleeding, illustrates the limits of conservative treatment in trauma grade IV [19]. The etiological treatment of acquired or congenital uropathy must be proposed later. We felt that it should be made after healing of injuries and the revaluation of the contus kidney function. Means considered most appropriate to assess renal scarring and the functional value of kidneys were CT and renal

scintigraphy with DMSA. The latter is reserved for severe renal parenchymal disease related to chronic underlying uropathy. Healing with recovery of renal function was constant for even the most affected by the preexisting obstruction parenchyma [3, 13, 18]. The best time to intervene surgically is no consensus. Indeed, the constitution of the retro-peritoneal effusion and possible surinfection may compromise the possibilities of restorative surgery. Bahloul suggests, in this regard, to intervene early in the course of the first week. Li in a recent study of 17 cases of trauma on ureteric junction obstruction syndrome, reported an average of 50 days before reconstructive surgery [3, 20]. For our part, the average time before etiological treatment was 113 days (42-247 days). This final treatment consisted of 2 plasty of the ureteropelvic junction, 2 nephrectomies for non-functioning kidneys measured at renal scintigraphy DMSA, and finally 2 indications of percutaneous nephrostolithotomy and one indication of shock wave lithotripsy for urolithiasis.

5. CONCLUSION.

Pathological kidneys are more vulnerable to trauma. These are dominated by road accidents and are in many cases revealing pathological kidney. The uropathies most frequently associated with the trauma of the kidney are urolithiasis syndrome, ureteropelvic junction and less frequently tumors and cysts of the kidney. In cases where the severity of the clinical condition is not compatible with traumatic injuries, urological underlying lesion should be suspected. CT is considered the "gold standard" for the diagnosis, assessment of the severity and monitoring. The therapeutic approach must be conservative, especially as it comes to young patients with long life expectancy. The current trend is to drain the urinary tract in the acute phase and to propose a late etiological treatment.

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