International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

Renal Trauma a Retrospective Experience

Bedri Mihaj

Service of Urology, University Hospital of Trauma, Tirana, Albania

Abstract: ***The kidneys are the most vulnerable genitourinary organ in trauma, as they are involved in up to 3.25% of trauma patients. The purpose of this article is to place the renal trauma where it belongs in relation to the surgical damages in general, and to the urogenital trauma in particular. Also, we are going to determine the cause of renal trauma. We are going to conclude the complexity of the early examinations for a quick diagnostician. Additionally, this article will identify the top rated renal trauma treatment methods. Materials and methodology: This is a retrospective study of renal trauma cases for the period times1991-1997 and 2000-2014. Results: During this period times1991-1997 we had impairment of firearms (47 cases) and other causes (27 cases). During period 2000-2014 we had impairment of firearms (15 cases) and the category of other causes were 52 cases. Complications were as the following: wound suppuration in 21 cases: urinoma in 4 cases: transitory hydronephrosis in 3 cases: fistula in 2 cases: renal avulsion with necrosis and renal vein injury 1 case respectively. Mortality resulted to be 2 cases or 10% in the period 1991-1996, in 1997 – 16% and during the period 2000-2014 – 10.5%. Conclusions: Conservative rather than operative management is preferred in high-grade blunt renal injury. However, there is an increased complication rate in high-grade injuries, and close observation is recommended for high-grade renal injury after conservative management.***

Keywords: kidney injury, multiple trauma, renal injury**,** hematuria

1. Introduction

The kidneys are the most vulnerable genitourinary organ in trauma, as they are involved in up to 3.25% of trauma patients andits management has evolved during the last decades, with a clear transition toward a nonoperative approach[1], [2]. The kidney is the most commonly injured organ of the genitourinary system during trauma. It is the third most frequently injured organ in abdominal trauma. Renal trauma can be an isolated injury but in 80–95% of cases there are concomitant injuries[2]–[4]. Blunt renal trauma in the adult population was caused primarily by motor vehicle accidents, followed by falls, sports and pedestrian accidents. The firearm is the main leading cause of renal trauma during the unrest situations and inarmed conflicts and less present in peace time, road accidents are often the cause of renal trauma with major concomitant injuries, iatrogenic causes mainly occur during the endoscopic and operator interventions, various aggressions, such as direct hits with hard or sharp objects, falling from height, direct hits as a result of hard objects and sport accidents and home accidents[4]–[6]. Physical examination and patient history helps to determine the location, extent and the severity of the injury. Blunt trauma to the flank, back, lower thorax and upper abdomen may harm the kidney. Urine analysis, hematocrit and creatinine levels are necessary tests in order to diagnose microscopic hematuria. Additional laboratory evaluation should include complete blood count and blood chemistry[7]. Ultrasound is used to define free fluid in the setting of trauma, but intravenous contrast-medium enhanced computed tomography (CT) is the gold standard imaging method for hemodynamically stable patients with blunt and penetrating renal trauma[8]. The priorities of renal trauma management are avoiding mortality by bleeding control, nephron sparing and avoiding complications[3], [4], [7], [9].

2. Results

In our study we included two period times1991-1997 and 2000-2014. In the first period we had

- Impairment of firearms (47 cases)
- Other causes (27 cases)

And during the period 2000-2014 we had:

- Impairment of firearms (15 cases)
- Other causes (52 cases)

In the category “Other causes”, during the period 1991-1997, road accidents have been dominant with 15 cases, followed by sport trauma with 9 cases, falling from heights with 2 cases and cold weapon with 1 case. In the period 2000-2014, road accidents have been dominant again with 34 cases, followed by sport trauma with 11 cases, falling from heights with 5 cases and cold weapon with 2 cases. Renal Trauma accounts for 3.5% of all traumas and has the highest probability which goes up to 54% of cases in relation to other organs of urogenital tract. Immediately, the urinary bladder comes after with 36% of cases. On clinical examination, filling the phrenicocostal angle that was present in cases of traumatic cases has been assessed.

- Lumbar muscle protection – 22 cases
- Lumbar ecchymosis - 9 cases
- Abdominal protection in all cases of firearms
- The entry and exit holes of bullet in all cases of firearm injuries.

For the radiologic examinations of patients we performed direct radiography examination in 102 cases, ultrasound echography in 120 cases, intravenous urography in 16 cases and CT-Scanner - 43 cases

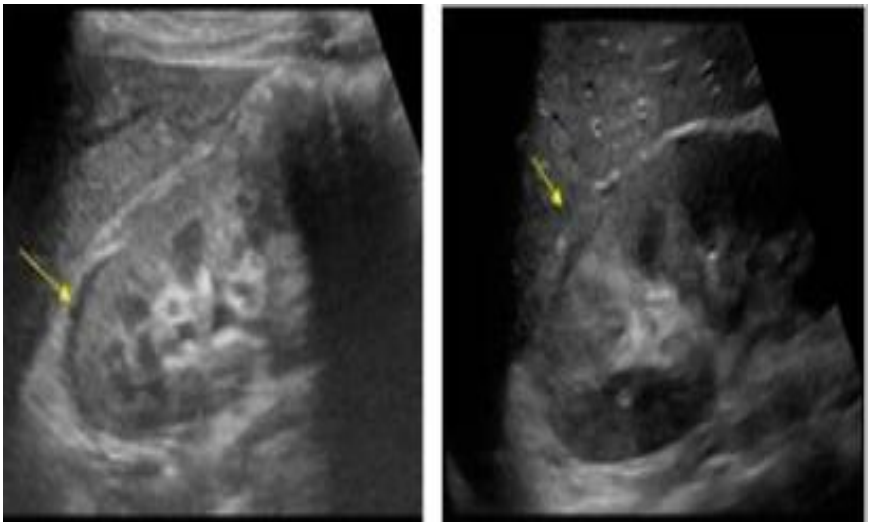

Figure 1: Ultrasound echograpfy images of laceration and hematoma around kidney

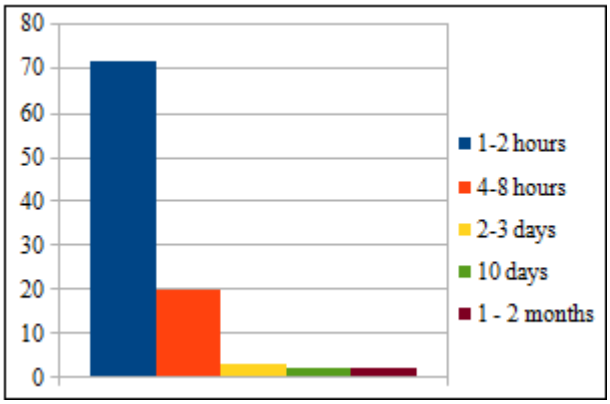

Figure 2: Time and dynamic of the presence after the injury from firearm and accidents in our study cases

Hematuria – 95% of our cases (Macroscopic hematuria 19.2%, microscopic hematuria 80.8%

Low back Pain or Lumbago– 91% of cases

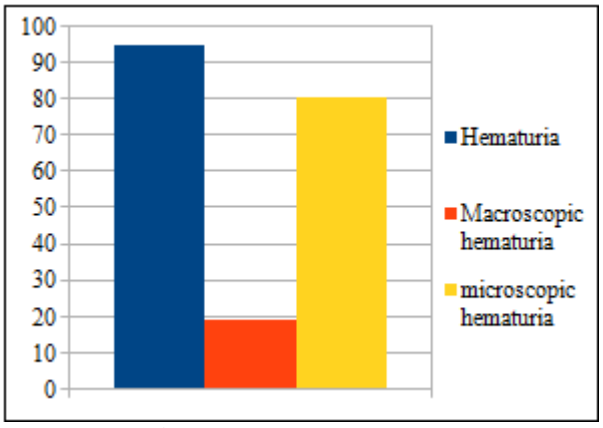

Figure 3: Urine examination

Complications were as the following:

- Wound suppuration in 21 cases
- Urinoma in 4 cases.
- Transitory Hydronephrosis in 3 cases
- Fistula in 2 cases.
- Renal avulsion with necrosis – 1 case
- Renal vein injury – 1 case

Concomitant injuries by organs are as follow (1991 – 1997 and 2000 - 2014):

- Small Intestine 23 cases
- Colon 24 cases
- Liver 22 cases
- Thorax 6 cases
- Duodenum 4 cases
- Pancreas 8 cases
- Ectopic kidney 1 case
- Stomach 1 case
- Gallbladder 1 case.

Surgical treatment has been performed as the following:

1) Operator interventions in the renal trauma are owned by urologists.
2) Solution of major concomitant thoracic abdominal injuries, by observing Hematoma Retroperitoneal interoperators, has been considered primarily.
3) Nephrectomy has been performed in 54 cases for all years (1991-2014).
4) Partial nephrectomy – 2 cases.
5) Suturing a laceration - 8 cases
6) We have observed 77 cases of renal injuries from the first grade to the forth grade.

Assessment of the case after accidents; careful observation; clinical, biological-radiological imaging monitoring; absolute bed rest; analgesic; liquids and antibiotic have been performed

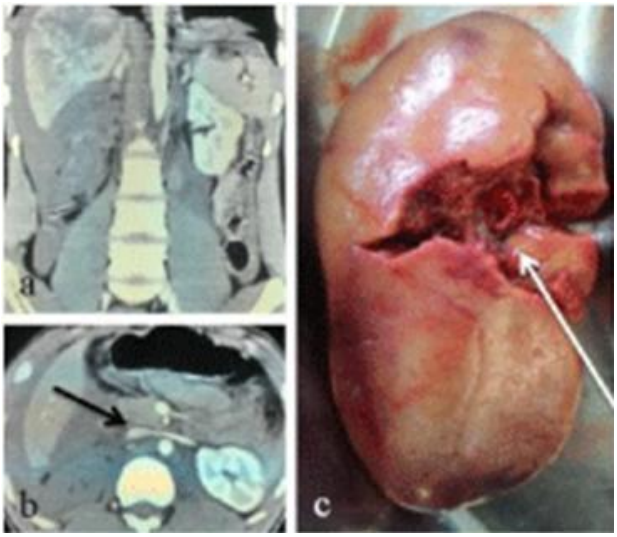

Figure 4: Nephrectomy after laceration renal hilum

Mortality resulted to be 2 cases or 10% in the period 1991-1996 and in 1997 we have had 16% or 11 cases and during the period 2000-2014 were 10.5% or 7 cases.

3. Discussion

Albanian data on renal trauma (especially contemporary data) is lacking. The number of renal injury are rising during the last years. The kidney is the third most commonly injured solid organ after blunt trauma, and the second most commonly affected after penetrating trauma[4].Every year, 245,000 renal trauma cases occur worldwide, with blunt trauma representing approximately 80% of cases[10]. The same data were find and in our study. During the years 2000-2014 we had more patients. Patient history and the injury mechanism are very important for making the right treatment decisions, especially in cases of solitary kidney. Physical examination may help to assess the location, extent and severity of the trauma. Any sign indicating renal trauma should be noted, such as visible hematuria, rib fractures and flank/upper abdomen hematoma. Hematocrit and creatinine levels are necessary to evaluate current blood loss status and baseline renal function. Urine analysis is used to diagnose microscopic hematuria. Except of physical examination a really important is the image like ultrasonography or Ct scan [5].CT scanning remains the gold standard investigation of renal trauma where patient stability allows. As seen in Fig 1 we use all the possibility to introduce radiologic examination.

In the past, penetrating injuries were believed to be at higher risk for bleeding and have traditionally been treatedmore aggressively [10]. Treatment options include conservative management, minimally invasive intervention, and open surgery. Conservative management typically involves bed rest, analgesia, hemodynamic monitoring, serial laboratory evaluation and reimaging when there is any deterioration. Minimally invasive intervention includes angioembolization for uncontrolled bleeding, or placement of ureteral stent, perinephric drain and nephrostomy tube for urinary extravasation [11]. Open surgeries were generally nephrectomy, partial nephrectomy, renorrhaphy, renal packing, or autotransplantation [2], [12].

Our study is limited due to its retrospective nature. Also, there were a number of different urologists practicing over the duration of the study, who likely had differing opinions and thresholds for intervention.

4. Conclusions

Conservative rather than operative management is preferred in high-grade blunt renal injury. However, there is an increased complication rate in high-grade injuries, and close observation is recommended for high-grade renal injury after conservative management.

References

[1] G. M. Chertow, E. Burdick, M. Honour, J. V. Bonventre, and D. W. Bates, “Acute kidney injury, mortality, length of stay, and costs in hospitalized patients,” *J. Am. Soc. Nephrol. JASN*, vol. 16, no. 11, pp. 3365–3370, Nov. 2005, doi: 10.1681/ASN.2004090740.

[2] T. Erlich and N. D. Kitrey, “Renal trauma: the current best practice,” *Ther. Adv. Urol.*, vol. 10, no. 10, pp. 295–303, Jul. 2018, doi: 10.1177/1756287218785828.

[3] E. Serafetinides *et al.*, “Review of the Current Management of Upper Urinary Tract Injuries by the EAU Trauma Guidelines Panel,” *Eur. Urol.*, vol. 67, no. 5, pp. 930–936, May 2015, doi: 10.1016/j.eururo.2014.12.034.

[4] S. Pathak and P. Cutinha, “Trauma to the genitourinary tract,” *Surg. - Oxf. Int. Ed.*, vol. 26, no. 4, pp. 165–171, Apr. 2008, doi: 10.1016/j.mpsur.2008.03.005.

[5] S. Singh and K. Sookraj, “Kidney Trauma,” in *StatPearls*, Treasure Island (FL): StatPearls Publishing, 2020.

[6] R. C. Alonso, S. B. Nacenta, P. D. Martinez, A. S. Guerrero, and C. G. Fuentes, “Kidney in Danger: CT Findings of Blunt and Penetrating Renal Trauma,” *RadioGraphics*, vol. 29, no. 7, pp. 2033–2053, Nov. 2009, doi: 10.1148/rg.297095071.

[7] M. J. Metro and J. W. McAninch, “Surgical exploration of the injured kidney: current indications and techniques,” *Int. Braz. J. Urol.*, vol. 29, no. 2, pp. 98–105, Apr. 2003, doi: 10.1590/S1677-55382003000200002.

[8] V. Miele, C. L. Piccolo, M. Galluzzo, S. Ianniello, B. Sessa, and M. Trinci, “Contrast-enhanced ultrasound (CEUS) in blunt abdominal trauma,” *Br. J. Radiol.*, vol. 89, no. 1061, p. 20150823, 2016, doi: 10.1259/bjr.20150823.

[9] F. Coccolini *et al.*, “Kidney and uro-trauma: WSES-AAST guidelines,” *World J. Emerg. Surg. WJES*, vol. 14, Dec. 2019, doi: 10.1186/s13017-019-0274-x.

[10] U. Mann, L. Zemp, and K. F. Rourke, “Contemporary management of renal trauma in Canada: A 10-year experience at a level 1 trauma centre,” *Can. Urol. Assoc. J. J. Assoc. Urol. Can.*, vol. 13, no. 6, pp. E177–E182, Jun. 2019, doi: 10.5489/cuaj.5581.

[11] H. Danuser, S. Wille, G. Zöscher, and U. Studer, “How to treat blunt kidney ruptures: primary open surgery or conservative treatment with deferred surgery when necessary?,” *Eur. Urol.*, vol. 39, no. 1, pp. 9–14, Jan. 2001, doi: 10.1159/000052405.

[12] M. K. Mansi and W. K. Alkhudair, "Conservative management with percutaneous intervention of major blunt renal injuries," *Am. J. Emerg. Med.*, vol. 15, no. 7, pp. 633–637, Nov. 1997, doi: 10.1016/s0735-6757(97)90175-3.