

**POST-TRAUMATIC THROMBOSIS OF RENAL ARTERIES AND THROMBOPHILIA: A  
CASE REPORT****Dalal El Hamssili<sup>\*\*</sup>, Tarik Bouattar<sup>a</sup>, Ingrid Marina Avome Mba<sup>a</sup>, Abbas El Messenaoui<sup>b</sup>, Loubna Benamar<sup>a</sup>,  
Rabia Bayahia<sup>a</sup> and Naima Ouzddoun<sup>a</sup>**<sup>a</sup>Nephrology-Dialysis-Kidney Transplant Service, Ibn Sina University Hospital Center, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University, Morocco.<sup>b</sup>Vascular Surgery Department, Ibn Sina University hospital Center, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University, Morocco.**\*Corresponding Author: Dalal El Hamssili**

Nephrology-Dialysis-Kidney Transplant Service, Ibn Sina University Hospital Center, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University, Morocco.

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**ABSTRACT**

Post-traumatic thrombosis of the renal arteries is a complication rarely described in the literature. It is a diagnostic and therapeutic emergency, despite the fact that the therapeutic management of this pathology is still a subject of controversy. Pathophysiologically, this pathology can result from intimal injury (inelastic) or compression of the renal artery against the spine by an impact on the anterior abdominal wall. This observation reports a case of post-traumatic thrombosis of both renal arteries due to protein C deficiency and resistance to activated protein c, exacerbated by hyperhomocysteinemia, mainly due to chronic smoking and cannabis use in our patient. The discussion of this case made it possible to understand the potential role of this type of anomaly in the development of this type of complication.

**INTRODUCTION**

Post-traumatic bilateral thrombosis of the renal arteries is a complication rarely described in the literature.<sup>[1-4]</sup>

The anatomical situation of the renal arteries in the retroperitoneum, protected by the abdominal musculature, is behind of the rarity of this pathology.

It is a diagnostic and therapeutic emergency. The revascularization should be as early as possible, with a delay of less than 5 hours, in order to preserve the functional prognosis of the kidney.

We report the case of a patient with bilateral post-traumatic thrombosis of renal arteries complicated by chronic end-stage renal failure.

**OBSERVATION**

Mr. E. L, age 26, having a history of smoking and chronic cannabism, victim of a road accident responsible for a polytrauma triple impact: the skull, lumbar pits and pelvis. The patient presented two hours after the emergency trauma. The admission examination found a conscious patient (GCS 15/15) with a stable hemodynamic state. Several abrasions were found at the flanks.

A simple fracture of the right ischiopubic branch was found on the radiograph of the pelvis. The brain scan was normal.

The biological assessment at admission indicated normal renal function, with hemoglobin at 10.3 g/dl without thrombocytopenia. The prothrombin rate was 84% with an activated partial thromboplastin time of 1.4.

Abdominal angioscan, performed 48 hours later, after the occurrence of total non-clotting hematuria and oligo-anuria accompanied by a rapid deterioration of renal function (creatinine 40 mg / L), showed a partial thrombosis of the right renal artery and total thrombosis of the left renal artery with renal vein thrombosis and near-total infarction of both kidneys.

The patient underwent revascularization of the right renal artery by angioplasty with placement of a stent 48 hours after the trauma, then put under curative anticoagulation based on unfractionated heparin and relay with antivitamines K and Clopidogrel.

A doppler of the renal arteries, performed 24 hours after revascularization, showed some areas of intraparenchymal hypovascularization in the right kidney with a slight rise in intraparenchymal resistance indices (0.72-0.73) and respect of hilum. The left kidney was ischemic.

A thrombophilia assessment, carried out in search of different etiologies and factors predisposing to thrombosis, allowed us to find:

- A protein C deficiency of 46%.
- A resistance level to protein C at 152.
- A normal S protein level of 109%.
- The antithrombin III level was normal at 105%.
- Moderate hyperhomocysteinemia at 36  $\mu\text{mol} / \text{L}$ .
- The immunoassay (antinuclear antibodies, anti-DNA antibodies, circulating anti-coagulants, anti-beta2 glycoprotein antibodies, anti-cardiolipin antibodies) was normal.

After ten days of anticoagulant treatment, the patient gradually restarted his diuresis, but without improvement in renal function after a follow-up of 3 months. The patient chose hemodialysis as a locum treatment.

## DISCUSSION

Our observation reports a renal infarction by thrombosis of the two renal arteries, total left and partial right, following a trauma at the point of lumbar impact.

Of patients with abdominal trauma, 1-4% will have renal vascular injury.<sup>[1]</sup> These lesions are classified as: avulsion, laceration, dissection and occlusion of the renal artery.<sup>[1,5]</sup> The latter entity poses a problem of therapeutic management.<sup>[1,4]</sup> Physiopathologically, this type of lesion results essentially from two mechanisms: either a lesion of the intima secondary to the trauma, or the compression of the renal artery against the spine.<sup>[1-10]</sup> However, the loss of protein C associated with trauma was found in only one case in the literature.<sup>[11]</sup>

In our observation, the exploration of blood crase showed three risk factors for arterial and venous thrombosis:

- A protein C deficiency.
- An increase in resistance to protein C.
- Moderate hyperhomocysteinemia.

These disorders of haemostasis may promote the occurrence of thrombosis in this context, thus justifying a systematic exploration of haemostasis in post-traumatic thrombosis of the renal arteries. Clinically, specific clinical manifestations (gross hematuria) may be absent in 36% of cases.<sup>[1]</sup> It is an attack that is rarely isolated, it comes within the framework of a polytrauma in 83% of cases.<sup>[1]</sup> In our observation, renal involvement was associated only with a right ischiopubic fracture. The relationship between cannabis use and the occurrence of renal artery thrombosis has been reported in several patients.<sup>[12]</sup> Cannabis causes a decrease in blood pressure, vasoconstriction and increases adhesion and platelet aggregation.<sup>[13,14]</sup>

The exact cause of protein C deficiency has not been determined. A congenital protein C deficiency seems to be the most probable cause. Finally, the role of protein

malabsorption in the regulation of coagulation (protein S and C and antithrombin III) seems unlikely. Indeed, the normality of the prothrombin and protein S levels pleads against this diagnosis.

The resistance to protein C is found at 159. It is due in 90% of cases to a factor V Leiden mutation.

In our patient the other causes of hypercoagulability have been eliminated, notably protein S deficiency, antithrombin III deficiency, antiphospholipid antibodies are negative. On the other hand, the other risk factors for thrombosis have not been eliminated, namely factor II and V gene mutations.

Hyperhomocysteinemia can be explained in our case by renal insufficiency by default of homocysteine elimination. Homocysteinemia is reported to be even higher in smokers, particularly among cannabis users, due to a change in vitamin B6 synthesis under the influence of tobacco.<sup>[15,16]</sup> Even the deficiency of vitamin b6 b9 and b12 can be incriminated in 2/3 of the cases.<sup>[17]</sup>

Therapeutic attitudes concerning this pathology are not consensual,<sup>[5,6]</sup> and vary between surgical revascularization, emergency angioplasty,<sup>[1,18,19]</sup> emergency thrombolysis,<sup>[4]</sup> simple surveillance.<sup>[1-3]</sup> or even nephrectomy right away.<sup>[1]</sup> Urgent revascularization is recommended in hemodynamically stable patients who are managed before the 5th hour.<sup>[1,6]</sup> It is also indicated in the case of thrombosis on a single kidney or in case of thrombosis of both renal arteries regardless of the time of management.<sup>[1]</sup> This is the case of our patient who underwent revascularization of the right kidney by angioplasty, forty-eight hours after the trauma, given the bilaterality of the thrombosis. Nephrectomy is indicated if revascularization fails.<sup>[1,3,7-9]</sup> In our observation, the indication for left nephrectomy was initially given the total infarction of the left kidney. On the other hand, the patient did not benefit from nephrectomy given the hemodynamic stability and the tolerance of the ischemic kidney.

## CONCLUSION

Post-thrombotic thrombosis of the renal arteries is a rare but potentially serious condition. In our patient, it is associated with a state of hypercoagulability due to protein C deficiency, an increase in protein C resistance and hyperhomocysteinemia. Hence the interest of carrying out a thrombophilia assessment. Revascularization associated with effective anticoagulation should be performed as early as possible to preserve the renal functional prognosis.

**CONFLICT OF INTEREST:** None.

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