



Case report

Conservative treatment of blunt traumatic right renal venous pseudoaneurysm: A case report

Sung Hoon Cho, Kyoung Hoon Lim*

Trauma Center, Kyungpook National University Hospital, School of Medicine, Kyungpook National University, Daegu, South Korea



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ABSTRACT

Introduction: Venous pseudoaneurysm is uncommon in blunt trauma patients, and renal venous pseudoaneurysm is especially rare, even though renal trauma occurs in approximately 8–10 % of abdominal trauma cases. There is controversy regarding the modality of treatment between surgery, conservative care, and radiologic intervention to manage renal venous pseudoaneurysms. We would like to share our experience treating blunt trauma patients having renal venous pseudoaneurysm with conservative care.

Presentation of case: A 53-year-old female patient was transferred to our trauma center following a pedestrian accident. Contrast-enhanced abdominal computed tomography (CT) showed right renal injury (grade II) with partial infarction (approximately 30–40 %) and peri-renal hematoma confined to Gerota's fascia without extravasation, a 3 cm sized right renal venous pseudoaneurysm, and a liver laceration (grade III) with a small amount of perihepatic hemoperitoneum. Since her vital signs were stable, with no decrease in the hemoglobin level in the short-term follow-up laboratory test, we decided to treat the patient conservatively in the trauma intensive care unit without angioembolization or surgery. The patient was discharged on the 14th day after OR/IF surgery for a right distal tibiofibular fracture. On a CT scan performed 1 month after discharge, a peri-renal hematoma was no longer observed, and the renal venous pseudoaneurysm had nearly improved.

Discussion: Patients with renal arterial injury with unstable vital signs require surgery or angioembolization. Even if vital signs are stable, arterial pseudoaneurysms are more likely to rupture; therefore, surgery or angioembolization is required. In contrast, venous pseudoaneurysms can be managed conservatively compared to intervention or surgery in vitally stable patients because they have a lower possibility of rupture due to relatively low pressure.

Conclusion: Renal venous pseudoaneurysms are very rare. Surgery, conservative care, and radiologic intervention should be considered depending on the patient's condition. Because venous blood flow is slower than arterial blood flow, renal venous pseudoaneurysm can be treated with conservative care if there are no injuries requiring further management and if the patient's vital signs are stable.

1. Introduction

Venous pseudoaneurysm is uncommon in blunt trauma patients, and renal venous pseudoaneurysm is especially rare, although renal injury occurs in approximately 8–10 % of blunt abdominal trauma patients. Renal arterial pseudoaneurysms require surgical or radiologic intervention because of the high risk of rupture. However, the choice of treatment modality among surgery, conservative care, and radiologic intervention for renal venous pseudoaneurysm remains controversial [1–4]. Renal venous pseudoaneurysm is less likely to rupture than renal arterial pseudoaneurysm, but there is a potential for thrombosis and loss

of renal function due to ischemic damage. This may be because renal venous pseudoaneurysms have lower blood flow than renal arterial pseudoaneurysms and, therefore, they are presumed to have a different clinical course.

Here, we share our experience of treating blunt trauma patients with renal vein pseudoaneurysm through conservative care.

This case report has been reported in line with the SCARE criteria [5].

* Corresponding author at: Trauma Center, Kyungpook National University Hospital, 130, Dongduk-ro, Jung-gu, Daegu 41944, South Korea.

E-mail address: drlimkh@knu.ac.kr (K.H. Lim).

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2. Presentation of case

A 53-year-old female patient was transferred to our trauma center after a pedestrian accident. On arrival, she complained of abdominal and right leg pain, and her blood pressure was 129/85 mmHg; heart rate, 84 beats/min; respiratory rate, 24/min; body temperature, 36.3 °C; and oxygen saturation using a reserve mask delivering 10 L/min was 100 %. The initial laboratory tests were as follows: Hemoglobin, 12.3 g/dl; platelet, 156,000/ μ L; AST/ALT, 463/378 U/L; and BUN/Cr, 14.2/0.68 mg/dL. Furthermore, gross hematuria was observed. Contrast-enhanced abdominal computed tomography (CT) showed right renal injury with partial infarction (approximately 30–40 %) and peri-renal hematoma confined to Gerota's fascia without extravasation, a 3 cm sized right renal venous pseudoaneurysm (grade IV), and a liver laceration (grade III) with a small amount of perihepatic hemoperitoneum (Fig. 1) [6]. A closed thoracostomy was performed because of right hemopneumothorax due to multiple rib fractures, and a splint was applied due to a right distal tibiofibular fracture.

Since her vital signs were stable and there was no decrease in the hemoglobin level in the short-term follow-up laboratory test, we decided to treat the patient conservatively in the trauma intensive care unit without angioembolization or surgery. There was no interval change in the amount of peri-renal hematoma as well as in the size of the right renal venous pseudoaneurysm on CT scan performed one day after admission. After several days, hematuria was improved, and hemoglobin and renal function tests were consistently within the normal range. Also, her vital signs remained stable.

On the 8th day of admission, the CT scan showed decreased peri-renal hematoma and decreased size of the renal venous pseudoaneurysm (Fig. 2). The patient was discharged without any complications on the 14th day, after OR/IF surgery for a right distal tibiofibular fracture. On a CT scan performed 1 month after discharge, a peri-renal hematoma was no longer observed, the renal venous pseudoaneurysm had nearly improved and no visible thrombosis but partial infarction of kidney was still remained (Fig. 3).

3. Discussion

Although renal injury occurs in approximately 8–10 % of abdominal trauma, of these, the incidence of renal vascular injury is 6–14 %, and the incidence of major renal vascular injury is less than 3 % [1–4]. Therefore, renal venous pseudoaneurysms due to blunt abdominal trauma are very rare.

Major renal vascular injuries cause significant morbidity and

mortality, such as hypovolemic shock, hematuria, renal necrosis with abscess, acute or chronic renal failure, and renovascular hypertension [2,3,7,8].

The management of traumatic renal injury remains controversial. The prognosis for traumatic renal injury differs depending on the type of injury, and whether it is a parenchymal injury or major vessel injury. Particularly, it is very different in terms of treatment, and prognosis depending on arterial or venous injury. The most important factor in determining the treatment modality for traumatic renal injury is the patient's vital signs [2,9]. Patients with renal arterial injury with unstable vital signs require surgery or angioembolization. Even if vital signs are stable, arterial pseudoaneurysms are more likely to rupture; therefore, surgery or angioembolization is required. In contrast, venous pseudoaneurysms can be managed conservatively compared to intervention or surgery in vitally stable patients because they have a lower possibility of rupture due to relatively low pressure.

There have been some case reports on treating a traumatic renal venous injury. Samuelson et al. reported a patient with traumatic right renal vein avulsion successfully repaired surgically with end-to-side anastomosis [10]. Monroe et al. described the successful endovascular treatment of a patient who sustained a traumatic renal venous pseudoaneurysm and renal arterial injury with hemodynamic instability after blunt trauma [2]. Mejia et al. conservatively treated a patient with renal venous pseudoaneurysm who was hemodynamically stable [1]. In contrast, Mun et al. reported their experience of treating patients with renal venous pseudoaneurysms in two steps. They performed renal arterial angiography due to suspected extravasation of contrast medium in enhanced abdominal CT; however, conservative management was considered since there was no extravasation in the injured renal parenchyma or vascular abnormality. However, because the hemoglobin level gradually decreased, a stent graft was inserted into the renal venous pseudoaneurysm with orthopedic surgery on the 4th day of hospitalization [3]. As such, a flexible change in the treatment method is necessary according to the change in the patient's condition.

Surgical exploration allows for expedient detection of bleeding and hemodynamic control but frequently results in nephrectomy due to uncontrolled bleeding, as meticulous surgical control of the renal vein is difficult because of the deep position of the operative fields. Despite successful surgery, patients often lose their kidney as graft vessel occlusion occurs due to low blood flow in the vein after graft interposition [2,8,10].

Radiologic interventions can be performed with excellent technical and clinical success; however, inserting a catheter into an injured vessel can worsen the injury, even surgery may be required. Using contrast

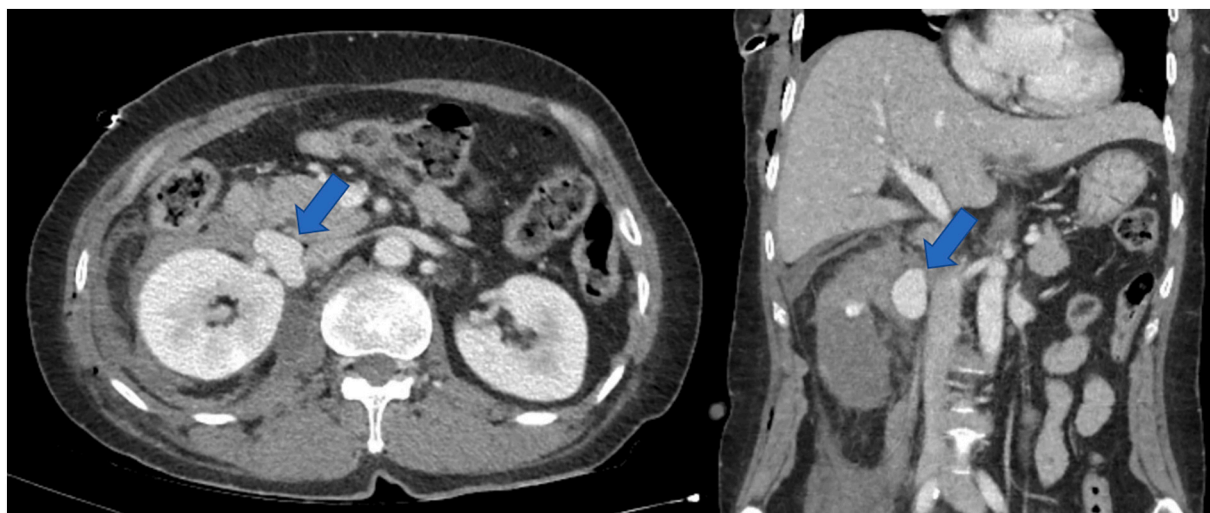


Fig. 1. Axial and coronal abdominal CT scan showing right renal venous pseudoaneurysm (arrow) on the day of trauma.

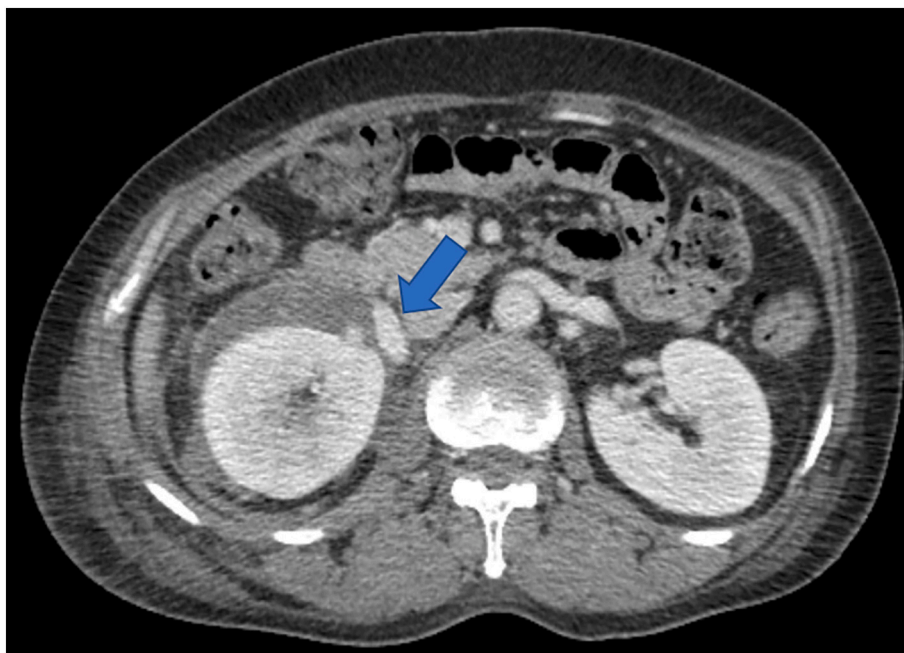


Fig. 2. Decreased size of right renal venous pseudoaneurysm (arrow) in abdominal CT scan on day 8 after hospitalization.



Fig. 3. An abdominal CT scan performed 6 weeks later, showing that the right renal venous pseudoaneurysm (arrow) has nearly improved.

medium in patients with renal injury may further promote renal failure, and low blood flow in veins can cause stent graft occlusion and renal venous thrombosis. In such cases, anticoagulation therapy may be required, which can cause other bleeding-related complications [3,9].

According to the American Association for the Surgery of Trauma (AAST) organ injury scale, as our case, renal vascular pseudoaneurysm is included in grade IV. It is possible that the higher organ injury grade may prompt surgery or intervention such as angioembolization, but there is still controversy [6,11].

In our case, there was renal injury with venous pseudoaneurysm; however, there were no extravasation findings, and the patient's vital signs were stable. Accordingly, conservative care was selected.

Consequently, the renal venous pseudoaneurysm spontaneously improved without rupture or any other complications.

4. Conclusion

Renal venous pseudoaneurysms are very rare, and surgery, conservative care, and radiologic intervention should be considered depending on the patient's condition. Because venous blood flow is slower than arterial blood flow, renal venous pseudoaneurysms can be treated with conservative care if there are no injuries that require further management and the patient's vital signs are stable. However, if changes in the patient's condition are observed, such as continuous blood loss or

unstable vital signs, surgery or radiological intervention should be performed flexibly at any time.

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Ethical approval

This study was a retrospective chart review and did not require patient consent.

Consent

This study was a retrospective chart review and did not require patient consent. Identifying details was omitted.

Author contribution

Kyoung Hoon Lim conceived of the presented idea and encouraged Sung Hoon Cho to investigate and supervised the findings of this work.

Sung Hoon Cho took the lead in writing the manuscript.

All authors discussed the results and contributed to the final manuscript.

Registration of research studies

Not applicable.

Guarantor

Kyoung Hoon Lim, MD, PhD.

Declaration of competing interest

No potential conflicts of interest relevant to this article are reported.

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