Case Report

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Subcostal artery bleeding after percutaneous nephrolithotomy: a case report and literature review

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Abstract

Postoperative bleeding is a dangerous complication after percutaneous nephrolithotomy (PCNL). Pseudoaneurysm, arteriovenous fistula, and arterial laceration are the three most common causes of post-PCNL bleeding. Subcostal artery bleeding is a rare cause. We herein present a clinical case involving a 43-year-old man who presented with right renal complex calculi and was managed by PCNL in the prone position using an inferior calyceal puncture approach. Intermittent extreme bleeding occurred 1 day postoperatively, and immediate renal angiography was performed. However, we found no sign of a pseudoaneurysm, arteriovenous fistula, or arterial laceration. Another well-trained and experienced doctor also found no pseudoaneurysm, arteriovenous fistula, or arterial laceration. After adjusting the catheter position, subcostal artery bleeding finally appeared and was successfully controlled by coils. This finding indicates that subcostal artery damage is one cause of post-PCNL bleeding. We suggest that clinicians should carefully and patiently perform angiography and/or embolization to avoid misdiagnosis and mistreatment.

Keywords

Percutaneous nephrolithotomy, bleeding, subcostal artery, renal calculi, renal angiography, coil embolization

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Introduction

Percutaneous nephrolithotomy (PCNL) was first described in 1976.[1] PCNL is now the first-line procedure for the treatment of large and complex renal stones.[2,3] However, postoperative complications, some of which are severe, still occur in some cases.[4,5] The most severe complication is bleeding, which occurs in 14% to 24% of patients after surgery; among these patients, 0.8% require angiographic embolization or open surgery.[6] Pseudoaneurysm, arteriovenous fistula, and arterial laceration are the three main causes of bleeding as shown by renal angiography.[7,8] We herein report a rare event of subcostal artery bleeding. We also discuss the causes of the bleeding and the arterial embolization technique. This case is being reported to inform clinicians that subcostal artery damage is one cause of severe bleeding after PCNL and that angiography/embolization should be carefully and patiently performed to avoid misdiagnosis and mistreatment.

Case report

A 43-year-old man presented with right renal calculi located in the middle and inferior calyces and was managed by PCNL in the prone position using an inferior calyceal puncture approach. Target papillary access was achieved by a 24-Fr balloon dilator under combined ultrasound and radiographic guidance. The procedure and the perioperative course were uneventful. At the end of the surgery, a clamped 20-Fr Foley catheter was inserted as a nephrostomy tube to suppress potential hemorrhage of the renal parenchyma or damaged veins. On postoperative day 1, the tube was routinely opened. However, intermittent intense bleeding was observed through the drainage tube, and the bleeding was accompanied by changes in the patient's position. He underwent transfusion with three units of blood, and his hemodynamic parameters stabilized. Renal angiography was immediately performed. At first, we did not consider subcostal artery injury. Subcostal artery bleeding should occur from the edge of the nephrostomy tube instead of from the inside; alternatively, it manifests as massive bleeding at the access site when performing tubeless PCNL. At first, however, selective angioembolization (SAE) did not reveal positive findings, such as pseudoaneurysm, arteriovenous fistula, or arterial laceration. Another well-trained and experienced doctor also found no pseudoaneurysm, arteriovenous fistula, or arterial laceration. After careful and patient adjustment of the catheter position several times, subcostal artery bleeding finally appeared (Figure 1). The bleeding was successfully controlled by coils.

Discussion

Post-PCNL bleeding is a life-threatening complication.[9–11,14] The incidence of major postoperative bleeding requiring angiography and embolization is around 0.8%.[6] Pseudoaneurysm, arteriovenous fistula, and arterial laceration are the most common imaging features during renal arteriography. Srivastava et al.[13] retrospectively analyzed the data of 1854 patients who underwent PCNL. Of all patients, 27 (1.4%) required angiography and/or embolization to control bleeding. SAE revealed pseudoaneurysm in 13, arteriovenous fistula in 6, a combination of both in 4, lumbar artery injury in 1, and no lesion in 3 patients.

In the present case, we found no reason for the bleeding in the beginning of renal angiography. However, an experienced doctor eventually found bleeding of the subcostal artery after a careful and patient operation, suggesting that the angiography and embolization procedures should be

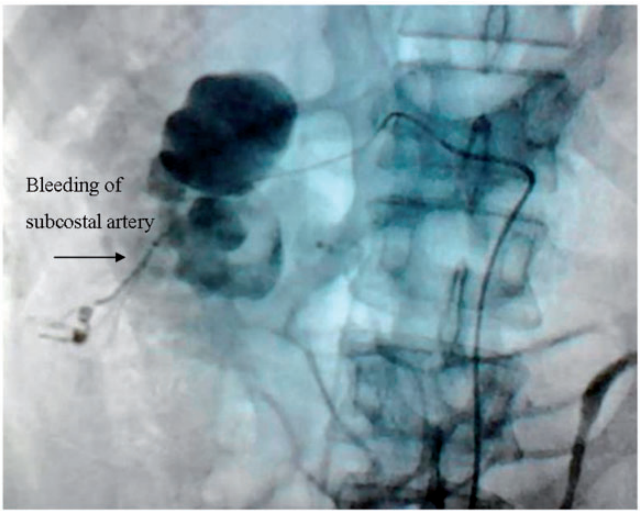

Figure 1. Appearance of subcostal artery bleeding during arteriography.

performed as thoroughly as possible. To avoid missed diagnoses and repeat examinations, we must focus on more than just the common causes of bleeding.

Many risk factors can predict the occurrence of post-PCNL bleeding.[15,16] In our previous study, we found that a longer operation time, the absence of preoperative hydronephrosis, multiple punctures, and a comparatively gross nephroscope passage were significantly associated with the risk of severe bleeding during PCNL.[17] Lee et al.[18] reported that the predictive factors for post-PCNL bleeding included staghorn stones, a high body mass index, large stones, a prolonged operation time, and the absence of hydronephrosis.

SAE is an efficacious and well-tolerated method of controlling post-PCNL bleeding. However, the success rate of SAE is only 80%.[12] Ganpule et al.[12] believed that multiple punctures and evidence of more than two lesions predict a high risk of failure of SAE. In 2011, a global study involving 5537 patients investigated factors affecting bleeding complications associated with PCNL.[19] The study showed that factors associated with bleeding/transfusion in PCNL include the sheath size, operating time, stone load, and caseload. Zeng et al.[20] further retrospectively reviewed the records of 17,619 patients who underwent PCNL at 6 centers and studied the risk factors for failure of initial renal arterial embolization for severe post- PCNL hemorrhage. They found that not using a gelatin sponge as the only embolic material could potentially decrease the risk of failure of initial superselective renal arterial embolization after PCNL.

Conclusion

In summary, subcostal artery damage is one reason for post-PCNL bleeding. We suggest careful and patient performance of angiography and/or embolization to avoid misdiagnosis and mistreatment.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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