

SPONTANEOUS RESOLUTION OF HAEMATURIA AND CLOT RETENTION AFTER COVID-19: A CASE REPORT

*Resolusi Spontan Hematuria dan Retensi Bekuan Setelah COVID-19:
Laporan Kasus*

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Abstrak

Penyakit coronavirus 2019 (COVID-19) telah dikaitkan dengan keadaan hiperkoagulabilitas yang menyebabkan peningkatan risiko kejadian tromboemboli dalam pembuluh darah. Sifat manifestasi ginjal COVID-19 biasanya melibatkan trombosis mikrovaskular yang menyebabkan cedera ginjal. Trombosis arteri ginjal utama pada COVID-19 dianggap cukup jarang terjadi. Dalam laporan ini, kami menyajikan kasus seorang wanita berusia 26 tahun yang menjalani nefrolitotomi perkutan (PCNL) untuk nefrolitiasis dan kemudian mengalami hematuria berulang dan retensi bekuan. Meskipun telah dilakukan perawatan awal, termasuk PCNL dan pemasangan stent ganda-J (DJ), pasien mengalami gejala urin yang persisten. Investigasi lebih lanjut mengungkapkan massa hiperdens yang besar yang menunjukkan retensi bekuan di kandung kemih yang terdistensi. Manajemen melibatkan sistoskopi untuk evakuasi bekuan, bersamaan dengan protokol standar untuk trauma ginjal dan infeksi saluran kemih. Menariknya, pasien mengalami perbaikan klinis yang signifikan setelah terkena COVID-19. Peristiwa tak terduga ini menyebabkan hilangnya hematuria dan retensi bekuan tanpa memerlukan terapi antikoagulan. Meskipun menunjukkan gejala COVID-19 ringan, pasien menunjukkan parameter koagulasi yang abnormal, termasuk D-dimer yang meningkat, waktu protrombin, dan dimer degradasi fibrin. Namun, setelah isolasi dan pengobatan, parameter-parameter ini normal, dan studi pencitraan berikutnya tidak menunjukkan bukti pembekuan darah. Kasus ini menegaskan dampak potensial COVID-19 pada kejadian trombotik dan manifestasi renal, menyoroti pentingnya kewaspadaan dalam mengelola komplikasi tromboemboli, terutama dalam konteks prosedur ginjal. Penelitian lebih lanjut diperlukan untuk mengungkap mekanisme yang mendasari tromboembolisme terkait COVID-19 dan implikasinya dalam praktik klinis, yang pada akhirnya akan memandu strategi pencegahan dan pengelolaan yang lebih efektif.

Kata kunci: COVID-19, hematuria, retensi bekuan, trombosis

Abstract

The coronavirus disease 2019 (COVID-19) has been associated with a hypercoagulable state which leads to an increase risk of thromboembolic events in blood vessels. The nature of renal manifestation of COVID-19 usually involves microvascular thrombosis resulting kidney injury. Major renal artery thrombosis in COVID-19 is considered quite rare. In this report, we present a case of a 26-year-old female who underwent percutaneous nephrolithotomy (PCNL) for nephrolithiasis and subsequently developed recurrent haematuria and clot retention. Despite initial treatment, including PCNL and placement of a double-J (DJ) stent, the patient experienced persistent urinary symptoms. Further investigations revealed a large hyperdense mass suggestive of clot retention in the distended bladder. Management involved cystoscopy for clot evacuation, alongside standard protocols for renal trauma and urinary tract infection. Remarkably, the patient experienced a significant clinical improvement following contraction of COVID-19. This unexpected turn of events led to resolution of haematuria and clot retention without the need for anticoagulant therapy. Despite exhibiting mild COVID-19 symptoms, the patient displayed abnormal coagulation parameters, including elevated D-dimer, prothrombin time, and fibrin degradation dimer. However, following isolation and treatment, these parameters normalized, and subsequent imaging studies revealed no evidence of clot formation. This case underscores the potential impact of COVID-19 on thrombotic events and renal manifestations, highlighting the importance of vigilance in managing thromboembolic complications, particularly in the context of renal procedures. Further research is warranted to elucidate the underlying mechanisms of COVID-19-associated thromboembolism and its implications for clinical practice, ultimately guiding more effective prevention and management strategies.

Keywords: COVID-19, haematuria, clot retention, thrombosis

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a multisystemic disease that potentially rise unprecedented problems in patients. This disease has been associated with a hypercoagulable and thrombotic state at alarming levels, leading to thromboembolic events.(Abou-Ismael et al., 2020) This is predicted to be a result of a heightened inflammatory response leading to a thrombo-inflammation through cytokine storm of complement activation.(Abou-Ismael et al., 2020) It was also hypothesized that the virus could activate the coagulation cascade.(Oudkerk et al., 2020) The incidence of

thrombotic disease in COVID-19 patients could reach as high as 31%. (Rico-Mesa et al., 2020) Most thrombosis events affect major blood vessels, for example, vessels of the limbs. Major artery thrombosis in renal arteries is considered very rare. (Acharya et al., 2020; Philipponnet et al., 2020)

Haematuria is one of the most common presentations in an outpatient and emergency setting.(Saleem & Hamawy, 2024) Generally it happens because of structural alterations due to an injury of the renal-urological system. According to the location of injury, causes of haematuria are divided into glomerular and non-glomerular.

Haematuria of non-glomerular origins manifests as reddish or pink urine, eumorphic erythrocytes, and passage of blood clots. (Saleem & Hamawy, 2024) Non-glomerular causes of haematuria can be due to a urinary tract infection, stones, malignancy, trauma (renourology injury), or iatrogenic injury. Management depends on the underlying aetiology. Gross haematuria needs prompt treatment, prioritizing hemodynamic stability, and subsequent definitive treatment. Interventional radiology-guided embolism might be needed to control bleeding from renal vasculature refractory to conventional or conservative treatment. (Mavili et al., 2009; Saleem & Hamawy, 2024; Wang et al., 2015) Here we report a case of a 26-year-old female with recurrent haematuria and clot retention post PCNL for nephrolithiasis, who experienced drastic improvement of complaints, after experiencing COVID-19.

2. METHOD

Case Presentation

A twenty-six-year-old Indonesian female presented to our facility with a two-week history of nausea, vomiting, and flank pain. On admission, the patient was afebrile but exhibited tachycardia. Initial assessment included a complete blood count, which returned normal results. The patient had previously been diagnosed with nephrolithiasis and was referred to our facility for further evaluation and treatment.

Diagnostic Assessment

Confirmation of nephrolithiasis was obtained through a CT scan performed at our facility, revealing a 20 mm calcific density in the right renal calyx. Subsequently, the patient underwent percutaneous nephrolithotomy (PCNL) with placement of a right double-J (DJ) stent. The patient was discharged after

three days of postoperative care, with no evidence of residual stones upon pre-discharge evaluation

Clinical Course

Approximately one month later, the patient presented to our emergency unit with complaints of urinary retention and a recent episode of hematuria. Imaging studies, including a CT scan of the abdomen and pelvis, revealed a large, rounded, hyperdense mass in the distended bladder, suggestive of clot retention.

Treatment Strategies

Initial management involved spooling with a 3-way Foley catheter and a piston syringe for clot evacuation. Subsequently, the patient underwent cystoscopy for further clot evacuation. Given the suspicion of renal trauma, treatment included total bedrest, urinalysis, and serial hemoglobin laboratory examinations. Urinalysis during hospitalization revealed improvement of hematuria but elevated leucocytes, prompting a diagnosis of urinary tract infection. Antibiotic therapy with ampicillin/sulbactam was initiated and continued for seven days, resulting in resolution of the urinary tract infection.

Outcome and Follow-up

Despite initial improvement, the patient returned two weeks later with recurrent hematuria and clot retention. Initial treatment involved spooling followed by DJ-stent placement. However, the patient tested positive for COVID-19 upon preoperative evaluation, leading to transfer to the COVID-19 unit. The patient experienced clot retention during hospitalization in the COVID-19 unit, which was managed with spooling. Following 14 days of isolation with generally mild symptoms, the patient was discharged. Hypercoagulation

workup upon discharge revealed elevated D-dimer, prothrombin time, and fibrin degradation dimer levels. Despite these abnormalities, anticoagulant therapy was not administered. Subsequent evaluations indicated no recurrence of hematuria or clot retention on CT scan prior to discharge

3. RESULT



Figure 1. CT-scan shows renal calculi on the right kidney

A twenty-six-year-old Indonesian female presented to our facility with a history of nausea, vomiting, and flank pain that had lasted for 2 weeks. At the time of presentation to our facility, the patient was afebrile with tachycardia. Complete blood count showed normal results. Before being referred to our facility, the patient was diagnosed with nephrolithiasis and was sent to our facility for further workup and

treatment. This diagnosis was confirmed with the patient's first computerized tomography (CT) scan in our facility, which demonstrated a 20 mm calcific density in the right renal calyx (Figure 1). The patient underwent percutaneous nephrolithotomy (PCNL) and placement of a right double-J (DJ) stent. The patient was discharged after 3 days of care, no stone was visualized upon pre-discharge evaluation. Approximately a month later, the patient presented to our emergency unit with complaints of urinary retention for the past two days and a history of passing blood and blood clots in her urine (haematuria) five days before. A CT-scan of the abdomen and pelvis demonstrated a large, rounded, hyperdense mass in the distended bladder, with a "whorled" appearance indicative of blood clot (Figure 2). Initial treatment was done by spooling with a 3-way foley catheter and a piston syringe. As a definitive treatment, the patient underwent cystoscopy for clot evacuation. The patient was treated as a patient with renal trauma, in which treatment and workup include total bedrest, urinalysis, and serial haemoglobin laboratory examinations. Urinalysis on the tenth day of this period of hospitalization revealed improvement of haematuria. It however also revealed high leucocytes. The patient was then diagnosed with a urinary tract infection and was treated with antibiotics of ampicillin/sulbactam 3 grams every 6 hours for 7 days. After a total of 14 days of hospitalization and no haematuria, the patient was discharged.



Figure 2. CT-scan shows a hyperdense mass in the distended bladder. Given the clinical context, it is consistent with haemorrhage and blood retention

Two weeks later, the patient came back to our clinic with complaints of haematuria and clot retention. Spooling was done as initial treatment. The patient underwent a DJ-stent placement. During this period of hospitalization, the patient experienced continuous haematuria. The patient was initially planned to undergo a nephrectomy procedure. However, upon preoperative evaluation for COVID-19, her RT-PCR nasopharyngeal swab yielded positive results. The patient was transferred to the COVID-19 unit. On the first day of hospitalization the patient experienced clot retention and spooling was done once. The patient was

discharged after 14 days of isolation in the COVID-19 with generally mild symptoms throughout this period. However, on discharge, the patient showed abnormalities upon hypercoagulation workup, with elevated D-dimer (13.54), prothrombin time (19.6), and fibrin degradation dimer (14.02). The patient was not given anticoagulants. After the last complaint of haematuria and clot retention, the patient never had similar complaints. A CT-scan as an evaluation prior to discharge also indicated no formation of blood clots

4. DISCUSSION

COVID-19 has been described as a condition associated with multi-system clinical pathologies. Clinical data suggested that COVID-19 results in a hypercoagulable state in patients leading to higher risk of arterial and venous thromboembolic events, for example stroke, pulmonary embolism, and limb ischemia. (Abou-Ismaïl et al., 2020; Acharya et al., 2020) Studies describing the pathophysiology regarding the effect of COVID-19 on renal structure and function are still underway. From previous systematic review by Wang, et al, kidney disturbances due to COVID-19 manifest as kidney dysfunction (elevated blood urea nitrogen and serum creatinine), radiographic abnormalities of kidney, and abnormal urinary analysis (haematuria and proteinuria), with proteinuria being the most common presentation. Direct renal infection by SARS-CoV-2 is quite unlikely since despite the existence of SARS-2 receptors in the kidney, the viral load of the virus in the kidneys is low. Systemic effects of SARS-CoV-2 infection on the kidneys are predicted due to an imbalance host immune clearance and immune tolerance, or a thrombus

formation. (Wang et al., 2021) Patients are usually found with lymphopenia, resulting in weakened immune clearance. As a feedback mechanism, this condition leads to an overproduction of inflammatory cytokines or a cytokine storm, causing tissue damage. In the kidneys, there is possible infiltration of inflammatory cells in the renal interstitium, destroying infected renal cells, with a side effect of local inflammation and tissue injury. Cytokine storm can also induce endothelial cell injury, leading to an upregulation of tissue factors, activating the coagulation pathway. (Zhang et al., 2020) The complement system can also play an important role, since it accelerates thrombosis, adhesion and aggregation, and endothelial cell injury. Thrombus formation in kidneys, however, usually manifests as extensive microthrombi. (Wang et al., 2021)

Gross haematuria is defined as the presence of blood or red blood cells in the urine, to the quantity that can be visible to the naked eye, usually manifesting as red or brown colored urine.¹¹ This is usually a result of a non-glomerular process, which includes a urinary tract infection, stones, malignancy, trauma (reno-urology injury), or iatrogenic injury. (Saleem & Hamawy, 2024; UpToDate, 2021) Blood in urine usually happens due to alterations in renal-urological structures or vasculature. Passing clots with gross haematuria usually indicates a lower urinary tract source, but it can also be seen in intrarenal bleeding or blood stasis. (UpToDate, 2021) Our patient experienced her first complaint of haematuria approximately one month post PCNL procedure for removal of a kidney stone in her right calyx. The patient had no history of haematuria prior to this complaint. We suspected that the patient's haematuria is a result of a delayed and massive haemorrhage

after a PCNL, which is a complication that happens in approximately 1% of patients having percutaneous renal surgery. The PCNL procedure inherently disrupts the high-flow arteriovenous network closely surrounding the collecting system, which receives around 20% of total cardiac output. Some amount of bleeding is expected and is often self-limiting and well controlled. Delayed haemorrhage is usually due to a vascular complication during a procedure, for example an arteriovenous fistula or arterial pseudoaneurysm, with the latter being more common. Arterial pseudoaneurysm happens due to a punctured artery or a transected artery that leaks into a contained cavity. Pseudoaneurysm in the renal system most commonly affects the interlobar and arcuate arteries. The artery might be transected partially or end during percutaneous nephrolithotomy puncture which arises the possibility of subsequent bleed into a contained space. The transected arterial branch may initially spasm or is partially thrombosed, thus not recognized as a bleeding artery in the operating room. As the patient increases her daily activity, the clog is possibly dislodged, resulting in a delayed occurrence of gross haematuria. (Valecha et al., 2017) The patient's complaints of passing blood clots in urine is a subsequent event of blood collecting in her bladder. The formation of blood clot creates a bladder outlet obstruction resulting in a urinary retention. (Xu et al., 2020)

Blood clot evacuation in the patient was done initially with manual bladder washout or spooling through a foley catheter and eventually a cystoscopy procedure. We suspected the cyclical transient improvement and recurring complaints of gross haematuria were a result of clot formation and subsequent dislodge of clot on the affected artery.

This patient was recommended to undergo a transcatheter arterial embolization (TAE) procedure and was supposed to do an angiography to confirm the diagnosis of iatrogenic renal arterial lesion pre-procedure. (Du et al., 2019) However, due to her unexpected diagnosis with COVID-19, both of these procedures were postponed since she had to be transferred to a COVID-19 isolation ward. TAE has a high success rate of cessation of bleeding in delayed bleeding due to PCNL, ranging from 85%-100% in different series of patients. (Chakraborty & Hatimota, 2019)

Thrombosis in the renal arteries is generally quite rare. Patients most likely already have some underlying endothelial injury that predisposes them to a development of renal artery thrombosis. The most common cause is thromboembolism originating in form the heart, with atrial fibrillation being one of the most common predisposing events. (Sauerberg & Khan, 2024) We did not find any abnormalities on our patient's cardiology workup, including her electrocardiogram. Hypercoagulability can also be a predisposing factor for renal artery thrombosis. (Sauerberg & Khan, 2024) Our patient laboratory workup indicated that she is in a hypercoagulative state, although she had not any other complaints of thrombosis in any other system. With the patient's resolution of symptoms of haematuria post PCNL, we suspected that she had thrombotic formations in the more distal arteries to the renal artery (arcuate or intralobular artery) as it is more commonly damaged during the procedure, compared to larger arteries. We only found three case reports for any renal artery thrombosis induced by COVID-19. In all three, however, the thrombus is located in the renal artery (main branch), and all three are confirmed with imaging. (Acharya et

al., 2020; El Shamy et al., 2021; Philipponnet et al., 2020) To our knowledge, occlusion of arteries distal to the main branch is still possible if the size of emboli or thrombus formation is appropriate to the artery

5. CONCLUSION

This article summarized a case of spontaneous resolution of haematuria after COVID-19 infection. Limited data suggest that macro or micro thromboembolic states might be possible in causing thrombus to the affected blood vessel causing haematuria. Further studies confirming these types of cases, with a prompt arteriography imaging is recommended to confirm causal relations

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