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Treatment of stoghorn dextra patient with history of hypertension under general anesthesia

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Abstract. Staghorn stones are a serious condition that is often associated with urinary tract infections and can lead to severe complications, especially in patients with hypertension. Assess the effectiveness and safety of staghorn stone treatment methods in patients with a history of hypertension and emphasize the importance of pre-operative evaluation and proper anesthetic technique. Analytical case study of a 69-year-old female patient with a history of hypertension and complaints of abdominal pain. The patient showed good recovery after surgery with close monitoring of hemodynamic stability. Appropriate use of general anesthesia successfully reduced the risk of complications during and after the procedure. A thorough pre-operative evaluation, including imaging studies and metabolic assessment, is essential for optimal outcomes. Alternatives such as RIRS show good results with lower risk of complications, especially in hypertensive patients. Metabolic control also plays an important role in the treatment of staghorn stones. A thorough pre-operative evaluation, including imaging studies and metabolic assessment, is essential for optimal results. Alternatives such as RIRS show good results with lower risk of complications, especially in hypertensive patients. Metabolic control also plays an important role in the treatment of staghorn stones.

1 Introduction

Kidney stones are hard objects produced by substances found in urine. Kidney stones can be made of uric acid, calcium oxalate, cystine, or struvite. Uteroscopy, shock wave lithotripsy, nephrolithotripsy, and percutaneous nephrolithomy are some of the techniques used to treat kidney stones (1). Lower back pain, nausea, blood in the urine, vomiting, cloudy-looking urine, fever, and shivering are symptoms that occur (2).

Blood vessel narrowing brought on by high blood pressure progressively weakens and destroys blood vessels, including the kidneys (3). This narrowing of the blood vessels will reduce blood flow (4). The blood vessels in damaged kidneys cannot work properly. As a result, The kidneys are unable of removing waste and fluid from the body, which can lead to renal failure (5). Research suggests that the dangerous link between hypertension and kidney

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stone formation may be related to high calcium levels (6). However, kidney stone formation is an event involving many factors, and many other risk factors for urinary tract stones have not been tested in people with hypertension. Patients with stable essential arterial hypertension, especially those who are overweight, fall into the high-risk category for kidney stone formation because they exhibit certain urinary problems that are usually found in stone formers (2). Actually, the initial urine results in hypertensive men differ from those in normotensive ones in that They have higher levels of uric acid, calcium, and oxalate. They also have higher fertility in terms of calcium phosphate and calcium oxalate, even though their magnesium levels are higher (7).

The gold standard for treating staghorn stones is percutaneous nephrolithotomy (PCNL), which attempts to preserve renal function while creating a stone-free collecting system. While PCNL works well for large stones with a high stone-free rate, the procedure also poses complications such as bleeding and infection, which are worse for patients with high blood pressure. A retrospective study found that those with a history of bleeding during PCNL had a higher risk of bleeding, making preoperative evaluation important (8).

Retrograde intrarenal surgery (RIRS) has become the preferred approach for treating tiny (≤2.0 cm) staghorn stones, and are considered a multidisciplinary approach. RIRS is known to be less expensive than PCNL, making it more attractive to cancer patients who have a higher risk of complications from invasive procedures. In a systematic review, RIRS showed good stone-free rates and low complications, making it the first choice for patients with limited medical conditions (9).

Treatment of staghorn stones in cancer patients should focus on preoperative evaluation, including imaging studies such as CT scan and urine culture to guide antibiotic selection and surgical planning. This evaluation is important to identify the underlying malignancy; a case report suggests that Kidney stones might increase the risk of developing kidney cancer (10). Therefore, urologists and oncologists are strongly encouraged to take a multidisciplinary approach to optimize patient treatment outcomes.

Studies have shown that metabolic control is also important in the treatment of staghorn stones. Russell and Preminger's study demonstrated that metabolic assessment can help pinpoint the reason of stone formation and provide appropriate medical treatment depending on the results (11). In addition, the combination of PCNL and RIRS has been shown to be successful in the treatment of staghorn kidney stones in patients with isolated kidneys.

Other recent studies have shown that the use of mini-PCNL is also popular as a kidney stone treatment option. Mini PCNL is a one- or two-stage surgery for treating staghorn kidney stones (8). Recent studies indicate that a two-phase therapy regimen may be more beneficial. This is significant because many cases with staghorn stones have several invasive percutaneous nephrostomies and require more than one stage of percutaneous surgery to produce satisfactory results.

Ultrasound-guided PCNL is an excellent treatment for big kidney stones (greater than 5 cm), including staghorn stones. This study emphasizes the need of early diagnosis and timely care to prevent morbidity and mortality (12). Additionally, the study by Kuroda et al. RIRS is thought to be the preferred choice for the treatment of kidney stones in patients with a solitary kidney because of its high stone-free rate and low risk of complications (9).

Study by Alghafees et al. This is the first case of a staghorn sarcoid compressing the inferior vena cava, thus highlighting the need for prompt diagnosis and appropriate treatment to prevent serious complications (8). The study also showed that ultrasound-guided PCNL can treat such stones without the need for other interventions.

Despite of the intricacy and invasiveness of operations such as percutaneous nephrolithotomy (PCNL), general anesthesia is required in the treatment of staghorn kidney stones, particularly in patients with hypertension (13)(14)(15). This approach reduces patient movement and discomfort during surgery, allows for better healing, and helps manage

complications that may arise from surgery and comorbidities, including hypertension. In addition, general anesthesia provides a controlled environment that is essential for maintaining hemodynamic stability during surgery, which is especially important for patients with high blood pressure.

In the context of long-term management, a study conducted by Deutsch and Subramonian showed the need for continuous monitoring of renal function in staghorn stone patients who did not proceed with surgery. It was found that 34% of patients experienced a decline in renal function over the following two years, even though they did not experience dependency on the disease (11).

Another study by Zhao et al. The combined application of PCNL and simple ureteroscopy was investigated as a new technique for large kidney stone surgery, which showed the positive effects of lithotripsy. The study also showed that the combination of these methods can increase the stone donation rate and reduce the risk of complications (12).

A review by Kuo et al. It has been demonstrated that metabolic disorders such hypercalciuria and hypocalciuria contribute significantly to the development of horn stones in some populations, hence preoperative physical examination is crucial (8)(10).

Overall, the treatment of staghorn kidney stones in hypertensive patients requires a thorough understanding of the complexity of this condition and the surgical options available. Advances in surgical techniques and preoperative evaluation have improved outcomes for patients with this challenging urologic disease. To evaluate the connection between hypertension and renal stone development and how it affects treatment results, more investigation is required (8)(11)(12).

2 Methode

The method in this study uses a case study description. In this study, the data is presented descriptively with narration Samples were taken from cases of patients diagnosed with staghorn stones. Data were collected through observation during the pre, intra and post antesthesia periods. Data were taken on August 22, 2024, at RSI Banjarnegara, Central Java, Indonesia. This research aims to anesthesiology nursing care for staghorn stones with hypertension uwho will undergo general anesthesia.

3 Case Report

A 69-year-old woman weighing 60 kg, came with complaints of pain in the right abdomen for 1 week, as well as other complaints, namely the patient said there was blood in the urine. The findings of the Provocating / Palliative, Qualitative, Region, Severity, Time (PQRST) pain assessment are pain when urinating, moderate pain with a pain scale of 5 using the *Numeric Rating Scale* (NRS) with intensity only arising when urinating.

Examination of anesthesia focus data on the assessment of *Allergies, Medications, Past Illness, Last Meal, Environments* (AMPLE) found that the patient did not have allergies to food, drinks and medicines. The patient has a history of controlled hypertension, and the patient has no history of previous surgery and anesthesia. Patients are satisfied to eat and drink for 8 hours before surgery. The patient does not smoke. The American Society of Anesthesiologists (ASA) has assigned this patient Physical Status II.

During pre-surgery, vital signs such as blood pressure 176/110 pulse 90 x/min temperature 36.5 and rr 20 x/min were examined. Supporting examination results were obtained including hemogoblin 12.8 g/dl leukocytes 6.35 / UI hematocrit 36.5% erythrocytes 4.51 million / UI platelets 260,000 / uL. During the intraoperative phase, the patient underwent general anesthesia using ETT with drug indications of recofol 100 mg, ethanyl

100 mcg, ondansetron 4 mg, dexketoprofen 50 mg, atropine sulfate 0.50 mg, neostigmine 1 mg, roculax 20 mg, and tranexamid acid 1000 mg. During the surgical phase, fluid and hemodynamic monitoring as well as airway monitoring were carried out to avoid complications when an ETT was installed. In addition, the patient was given inhalation anesthesia with 2% sevoflurane and O2 and N2O in a 2:2 ratio. After the operation was completed, The patient was moved to the Recovery Room for an assessment of consciousness monitoring, the patient was semi-conscious and said he was still weak after the operation with ttv results such as BP 115 mmHg, Pulse 70 x/min, RR 20x/min, Sp02 98%, Temperature 36.6 C and can be acted upon when Aldrete core >8.

4 Discussion

The patient belongs to ASA II, which is a patient who has no history of systemic disease, does not consume alcohol and does not smoke. The patient will undergo a surgical procedure for kidney stones using general anesthesia with ETT technique.

During surgery, the anesthesia used is general anesthesia. This is in accordance with the existing theory where general anesthesia and controlled ventilation techniques are expected to avoid hypercarbia and hypoxia. According to theory, general anesthesia accompanied by controlled positive pressure ventilation is the preferred technique, for several reasons, namely the risk of regurgitation due to increased intraabdominal pressure during insufflation, the need for controlled ventilation to prevent hypercapnea, the need for relatively high inspiratory pressure due to pneumoperitoneum the need for muscle relaxation during surgery due to low insufflation pressure, providing better visualization, preventing unwanted patient movement. So the technique is recommended in all patients (16).

All drugs have the same level of safety for induction in hypertensive patients. Propofol and etomidate are often chosen as they have a more stable vasodilating effect and do not cause a significant increase in blood pressure (16). The supine position is preferred, especially in patients with a history of hypertension, due to its advantages in hemodynamic stabilization and reduced risk of intraoperative problems. This position provides better cardiovascular control, reduces breathing difficulties, and facilitates stone removal by improving access to the kidneys and ureters (17)(18). Sevoflurane and isoflurane are inhaled agents that are often used as maintenance general anesthesia during surgery (19). Because it helps lessen bleeding and enhance postoperative recovery, tranexamic acid is frequently used in kidney stone surgery, particularly in individuals with a history of hypertension. As an antifibrinolytic, tranexamic acid helps minimize blood loss during surgery, which is especially crucial for hypertension patients whose hemodynamic stability may be jeopardized. According to recent research, it can raise hemoglobin levels following surgery and lessen the need for transfusions (20). Anesthesia is turned off at the end of surgery, and flumazenil or neostigmine is used to counteract RMZ or rocuronium. The ETT is withdrawn after the patient has resumed spontaneous breathing. The patient is subsequently moved to the post-anaesthesia care unit. When the post-anesthesia recovery score is 9 or higher, the patient is released from the post-anesthesia care unit (21).

5 Conclusion

Staghorn kidney stones are a complicated and difficult ailment, particularly in patients with a history of malignancy and hypertension. The stones are frequently associated with urinary tract infections and can cause major problems if not managed. Percutaneous nephrolithotomy (PCNL) is the conventional procedure for treating staghorn stones, but it has a higher risk of

complications in hypertensive individuals. Alternatives, such as retrograde intrarenal surgery (RIRS), provide a safer method with fewer complication rates, particularly for tiny stones.

To improve treatment outcomes, it is critical to do a full pre-operative examination that includes imaging studies and metabolic assessments. Furthermore, the proper administration of general anesthetic during the procedure is critical to maintaining hemodynamic stability, particularly in patients with hypertension. More study is needed to better understand the link between hypertension and kidney stone production, as well as to investigate innovative treatments for staghorn kidney stones that may improve clinical results and lower the risk of complications. A complete multidisciplinary strategy is likely to enhance results for patients with this difficult urological illness.

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