

Pyonephrosis due to congenital obstruction

Rizki Usaputro^{1*}, I Made Suyadnya¹

¹Karangasem Regional Hospital,
Karangasem, Bali, Indonesia,
80811

***Corresponding Author**

Rizki Usaputro
Karangasem Regional Hospital,
Karangasem, Bali, Indonesia,
80811

Abstract. Pyonephrosis is a suppurative infection of the upper urinary tract due to a combination of obstruction and hydronephrosis of the high urinary tract. Patients usually come with flank pain and fever with or without enlargement of abdomen. Pyonephrosis may lead to a urosepsis condition that can cause life threatening conditions if timely non-treated with antibiotics and surgical intervention. We report uncommon 2 cases of 16 years old female with pyonephrosis due to Ureteropelvic Obstruction and 21 years old female with pyonephrosis due to Uterovesical Junction (UVJ) Obstruction. Clinical features, work up diagnosis and management of the pyonephrosis with the review of literature have been discussed here.

Keywords: pyonephrosis, ureteropelvic junction obstruction, ureterovesical junction obstruction, megaureter, nephrectomy, urinary tract infection

Introduction

Pyonephrosis is a suppurative infection of the upper urinary tract due to a combination of obstruction and hydronephrosis of the high urinary tract [1-2]. It is usually associated with suppurative damage of renal parenchyma and renal function loss. Severe infection of pyonephrosis may lead to urosepsis condition [1]. The most common cause of pyonephrosis is kidney stone, one of the rare cause of pyonephrosis is anatomical abnormalities of the kidney and its system, like Ureteropelvic Junction (UPJ) Obstruction and Uterovesical Junction (UVJ) Obstruction [2-4].

UPJ Obstruction is impaired urine flow from pelvis to proximal ureter that cause the dilatation of collecting system and lead to potential damage to renal function.^{3,4} UVJ Obstruction is impaired urine flow from distal ureter to bladder that cause dilatation of ureter (megaureter) and collecting system and lead to damage of the renal function [3-5].

Case Report (1)

A 16 year old female came to the emergency department due to pain in her right abdomen 1 month before admission, with enlargement of the abdomen gradually since 1 year. There has been intermittent fever for 1 week. Transabdominal Sonography found the patient with severe

hydronephrosis of the right kidney. In blood biochemistry hemoglobin was 7.5 g/dL, total leukocytes count was 9370 cells/ μ L. Blood level of urea and creatinine was 20 mg/dL and 0.5 mg/dL respectively. Computed Tomography (CT) Urography shown grade IV hydronephrosis with obstruction at the ureteropelvic junction (UPJ) level (Fig. 1, Fig. 2).

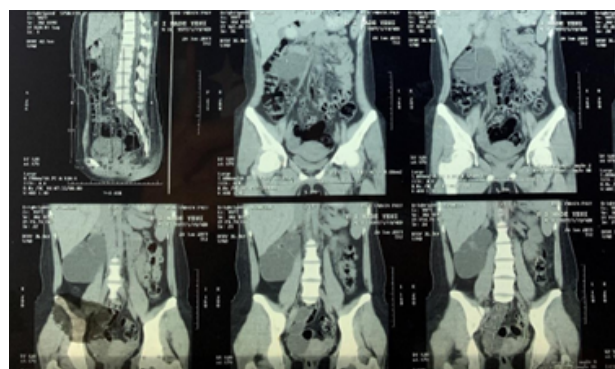


Figure 1. CT urography show right hydronephrosis with hydroureter

Percutaneous nephrostomy was chosen and 2100 cc of pus was collected in the first 24 hours. Urine output of the right kidney measured day per day and found the production of urine was <500cc per day, it's about only 50cc per day and dominated by pus in the nephrostomy catheter. Because of nonfunction of the right kidney, nephrectomy would be done to this patient.



Figure 2. CT Urography showing obstruction at UPJ Level

Laparoscopic nephrectomy was chosen for this patient, intraoperatively we found multiple adhesion of the right kidney with liver, duodenum, and ascending colon. Because of the adhesion, we convert to open surgical subcapsular nephrectomy (Fig. 3). The extracted kidney was split and found an amount of pus remains inside the kidney. There is no postoperative infection, the patient discharge after three days post operative.



Figure 3. Macroscopic picture of right kidney after subcapsular nephrectomy

Case Report 2

A 21 year old female came to the hospital due to enlargement and pain in her right abdomen 1 month before admission. She had a history of ureterovesical obstruction of the right kidney that known since 3 years ago, had performed surgery but no proper medical follow up. Transabdominal Sonography found the patient with severe hydronephrosis of the right kidney. In blood biochemistry total leukocytes count was 14200

cells/ μ L. Blood level of urea and creatinine was 33 mg/dL and 1.45 mg/dL respectively. Computed Tomography (CT) Urography showed grade IV hydronephrosis with hydroureter with susp distal stenosis of ureter.

Percutaneous nephrostomy was chosen and 2000cc of pus was collected in the first 24 hours. Urine output of the right kidney measured day per day and found the production of urine was <500cc per day, it's about only 30cc per day. Because of nonfunction of the right kidney, nephrectomy would be done to this patient (Fig. 4).

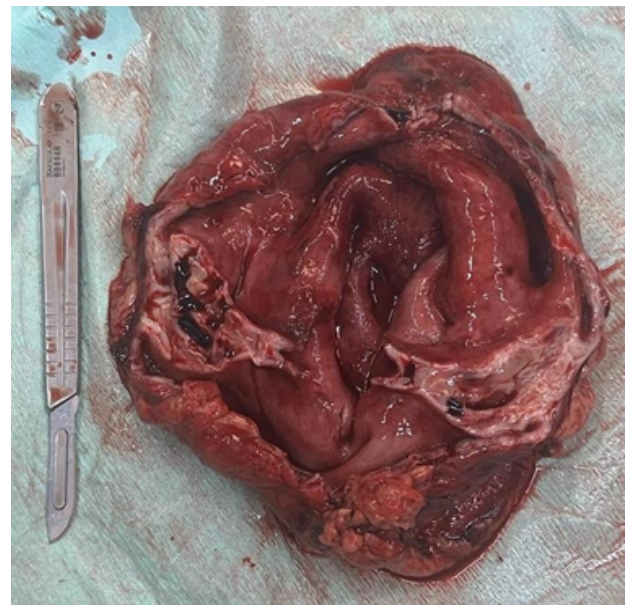


Figure 4. Macroscopic picture of right kidney after simple nephrectomy

Open Surgical Nephrectomy was chosen for this patient due to the possibility of adhesion of kidney to other organs. Intraoperatively we found enlargement of the right kidney with dilatation of proximal ureter. There is no postoperative infection, the patient discharge after three days post operative.

Discussion

Pyonephrosis is pus at the upper urinary tract as the result of obstruction. It is usually associated with suppurative damage of renal parenchyma and renal function loss. Severe infection of pyonephrosis may lead to urosepsis condition [1-2]. Commonly, the main anatomical factor of pyonephrosis is obstruction of ureter, with the main common cause being stones, at least in 70% cases [1-2]. Other causes are congenital causes like Ureteropelvic Junction (UPJ) Obstruction and Ureterovesical Junction Obstruction (UVJ) Obstruction that we found in this case [3-5].

UPJ Obstruction is anatomical distortion causing impaired urine flow from renal pelvis to proximal ureter, increasing back pressure to kidney and eventually leading to hydronephrosis and lead to potential damage to renal function [4][6]. UVJ Obstruction is impaired urine flow from distal ureter to bladder that cause dilatation of ureter (megaureter) and collecting system and lead to damage of the renal function [3-5].

Patients with pyonephrosis most commonly come to hospital with flank pain and fever. A total of 15% of patients will remain asymptomatic. Infection in an obstructed system may lead to urosepsis condition especially in immunocompromised patients [1][7]. On physical examination palpable abdominal mass in association with the hydronephrotic kidney. Rarely the infected hydronephrotic kidney may rupture spontaneously into the peritoneal cavity and lead to condition peritonitis and sepsis [7].

Diagnosis of pyonephrosis was made by physical examination, laboratory studies. Ultrasonography and CT Urography is very sensitive to diagnose pyonephrosis to identify severity of hydronephrosis and definitive delineation obstruction of the kidney [1-2]. Percutaneous nephrostomy is used both for diagnostic and therapeutic purposes of pyonephrosis [1][7].

Treatment of pyonephrosis including percutaneous drainage, retrograde ureteral stenting, and treatment for the cause of pyonephrosis like pyeloplasty in case of UPJ Obstruction, Ureteroneocystostomy in case of UVJ Stenosis, stone management of urolithiasis, and nephrectomy [1][3-4].

Conservative treatment with broad spectrum antibiotics is not so effective while surgical intervention is usually needed. Percutaneous nephrostomy is usually initial treatment to drain an obstructed system and calculating ipsilateral urine output, especially in septic patients, because it is the most less invasive and effective method to drain the pelvicalyceal system (PCS) [1-2][6]. Retrograde decompression by placing ureteral drainage is indicated to stable patients with no sign of haemodynamic instability. Retrograde decompression is more disadvantageous because of smaller calibre than percutaneous drainage, increased irritation on urinary tract, and in some patients not possible to bypass obstruction [7].

The need for nephrectomy after percutaneous drainage and broad spectrum antibiotics treatment is still debated. Nephrectomy is usually done in patients with non-function kidney that is usually expected in long standing pyonephrosis.

Laparoscopic nephrectomy is the first consideration and has been safer and effective with 28% of procedures needed to convert to open surgery such as our patient [7]. In both of our cases, the pyonephrotic kidney was non-functioning, so nephrectomy was performed.

Conclusion

Pyonephrosis is an uncommon suppurative infection of the kidney that is caused by ureteric blockage that may lead to sepsis condition, loss of renal function and death. Appropriate intervention needed based on the cause of pyonephrosis. Initial diagnosis and treatment is needed for congenital abnormalities of the urinary system to prevent pyonephrosis. Nephrectomy should be considerable to pyonephrosis patients with non-functioning kidney.

Conflict of Interest

The authors declare that they have no conflict of interests.

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