COMPREHENSIVE MANAGEMENT OF EMPHYSEMATOUS PYELONEPHRITIS, OUR INSTITUTIONAL EXPERIENCE- A DESCRIPTIVE STUDY

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ABSTRACT

BACKGROUND

Emphysematous pyelonephritis (EPN) is a severe necrotising infection of the renal parenchyma and perirenal tissue. It is a urological emergency.

Aims and Objectives- Our aim is to study comprehensive management of emphysematous pyelonephritis.

MATERIALS AND METHODS

This is a study of three years period at our hospitals (Government Kilpauk Medical College and Government Royapettah Hospital). Total 29 cases of Emphysematous pyelonephritis have been treated medically (conservatively) and surgically.

RESULTS

Patients were treated conservatively (medical management) and/or surgically in the form of DJ stenting, percutaneous drainage and nephrectomy.

CONCLUSION

Early diagnosis and effective management can prevent mortality.

KEY WORDS

Emphysematous Pyelonephritis, Double J Stenting, Percutaneous Drainage.

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BACKGROUND

Emphysematous pyelonephritis (EPN) is a severe necrotising infection of the renal parenchyma¹ and perirenal tissue. It is a urological emergency. It causes gas formation within the collecting system, renal parenchyma and perirenal tissues.² Gas in the renal pelvis alone without parenchymal gas is often referred to as emphysematous pyelitis. Emphysematous pyelonephritis is common in uncontrolled diabetes and immunocompromised patients and common in females (prone for recurrent UTI). Obstructing calculus, cause of EPN in non-diabetes patients.

Emphysematous pyelonephritis is rapidly progressive, requiring appropriate therapy to salvage the infected kidney.³ The clinical course of Emphysematous pyelonephritis can be severe and life-threatening if not recognised early and treated promptly. Identification of the adverse prognostic factors like elevated serum creatinine, shock, thrombocytopenia or altered sensorium are important for its successful management. The objective of the study was to evaluate aetiology and various management options in the treatment of Emphysematous pyelonephritis.

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MATERIALS AND METHODS

It is the descriptive study. About the patients admitted with Emphysematous pyelonephritis in Kilpauk Medical College and Govt. Royapettah Hospital during the period of last three years (2014 - 2017).

29 cases of emphysematous pyelonephritis admitted during Aug. 2014 - July 2017 and investigated with biochemical parameters, x-ray, ultrasound and CT KUB and functional status assessed by DMSA Renogram.

RESULTS

Among 29 cases of Emphysematous pyelonephritis, patients with features of septic shock managed in intensive care unit with higher antibiotics, fluid and electrolyte imbalance management, insulin therapy in case of elevated blood sugar in diabetes patients and haemodialysis done based on renal parameters. Almost 90% are diabetics and 10% are non-diabetics and only 10% cases underwent dialysis.

In our study 23 cases were females, 6 cases were males. Left kidney was affected more commonly about 74% than right kidney. Right kidney involvement was seen in 20% and bilateral involvement in 6% of cases. Emphysematous pyelonephritis is more common in patients more than 40 years of age, only 5 cases has been reported below 40 years of age, 12 cases were in between 40 - 60 years and 12 cases has been reported in above 60 years of age.

Most common organism causing Emphysematous pyelonephritis in our study was E. coli infection (Reported in 22 cases) followed by Klebsiella infection in 5 cases, other organisms seen in 2 cases.

Management

Three cases with class 1 (Classification by Huang and Tseng³) emphysematous pyelonephritis were managed conservatively with higher broad-spectrum antibiotics and supportive care. Nine cases with class 2 were managed surgically in the form of DJ stenting and Percutaneous drainage (PCD). Eight cases of class 3A and Seven cases of class 3B also initially managed with DJ stenting and PCD, but Three cases of class 3A and Four cases of class 3B ended in subcapsular nephrectomy. Two cases of class 4 were managed with DJ stenting and PCD.

Table 1. Management

Some of our case scenario are discussed below.

Case 1- 38 years old female had Emphysematous pyelonephritis class 2, managed with DJ stenting and Antibiotics.

Case 2- 52 years old female with diabetes had Emphysematous pyelonephritis class 3A, managed initially with percutaneous drainage and later subcapsular nephrectomy done following DMSA.

Case 3- 55 years old female with diabetes had Emphysematous pyelonephritis class 3B type, percutaneous drainage done initially and then subcapsular nephrectomy done following Renogram.

DISCUSSION

Most common aetiology of Emphysematous pyelonephritis is due to *E. coli* followed by *Klebsiella* species, less commonly by *Proteus*, *Pseudomonas*, *Streptococcus*, *Entamoeba histolytica*, *Aspergillus fumigatus* and *Clostridium*. *Candida* species have also been isolated in patients with Emphysematous pyelonephritis.

Classification by Huang and Tseng,² as per CT images are Class 1: Gas in collecting system only, Class 2: Gas in parenchymal tissue, Class 3A: Extension of gas into perinephric space, Class 3B: Extension of gas into pararenal space and Class 4: Emphysematous pyelonephritis in solitary kidney or bilateral disease. The pathogenesis of gas formation requires pathogenic bacteria capable of mixed acid fermentation, hyperglycaemic environment in case of diabetes and localised tissue ischaemia. Because a hyperglycaemic environment is one of the requirements in gas formation, it only makes sense that diabetes is a significant predisposing factor. It has been estimated that upto 95% of Emphysematous pyelonephritis cases have underlying uncontrolled diabetes mellitus.⁴ Hyperglycaemia in association with impaired blood supply to the kidneys from vasculopathy- both of which are prevalent in diabetic patients- facilitates the process of anaerobic metabolism.⁵ Other predisposing factors such as ureteric obstruction commonly due to calculus or immunological impairment.⁶ On histopathology is widespread microabscesses, interstitial inflammation, glomerulosclerosis and sloughed papillae are seen. The clinical approach to treating patients with Emphysematous pyelonephritis has changed over the years. Due to advances in medical imaging, interventional radiology, newer more effective antibiotic therapy and readily available intensive care integrated with dialysis support, patients with Emphysematous pyelonephritis have much better outcomes. Managing Emphysematous pyelonephritis more conservatively and DJ stenting has thus become the standard of care.⁷ In our centre patients were treated with broad-spectrum antibiotics, based on urine and PCD fluid culture results. Recent reviews of the management of Emphysematous pyelonephritis propose that percutaneous drainage should be part of the initial management strategy for Emphysematous pyelonephritis.⁸ In patients with

extensive/fulminant disease with haemodynamic compromise many have determined that together with fluid resuscitation and antibiotics, immediate nephrectomy should not be delayed for the successful management of Emphysematous pyelonephritis.⁹⁻¹¹ But in our study, patients with haemodynamic instability treated with supportive measures in intensive care unit and delayed subcapsular nephrectomy was done after assessing functional status by DMSA Renogram. Poor prognostic factors include thrombocytopenia, altered consciousness, shock and acute renal failure.¹²

CONCLUSION

In recent days, number of cases of emphysematous pyelonephritis is increasing due to increased incidence of diabetes mellitus, but the mortality rate decreased dramatically and is rare due to early diagnosis and effective management with available higher antibiotics and fluid and electrolyte imbalance management, early surgical intervention in the form of DJ stenting, percutaneous drainage and subcapsular nephrectomy done in rare cases. In our study, mortality is nil.

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