



ORIGINAL RESEARCH PAPER

General Surgery

THE EFFICACY OF DOUBLE J STENTING IN THE MANAGEMENT OF EMPHYSEMATOUS PYELONEPHRITIS

KEY WORDS: Double J stent, emphysematous, pyelonephritis

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ABSTRACT

Introduction: EPN is a severe infection of the renal parenchyma, which can be severe and life-threatening condition characterized by the presence of gas in the renal parenchyma, or perinephric tissues. In this study, we wanted to study the efficacy of double J stenting vs conservative management in cases of EPN. **Material and methods:** 30 cases of EPN were admitted in our institute in respect to age, sex, co-morbidities, urinalysis and ICU stay, antibiotics used and outcomes were analyzed following conservative management vs double J stenting with medical management. **Results:** All patients improved in both medical and surgical plus medical management; however, it was seen that patients undergoing double j stenting had lesser morbidity and mortality in terms of ICU stay, Antibiotic use and better outcome in comparison to patients undergoing conservative management alone. There was no mortality reported in our study **Conclusion:** Emphysematous pyelonephritis is a condition associated with high mortality of almost 13-25%, therefore it requires an aggressive management and our study has shown that patients managed with double J stenting along with medical management can be recommended over medical management alone.

INTRODUCTION:

EPN is defined as infections of acute, severe, necrotizing natures resulting in the accumulation of gas within the renal parenchyma, it was first reported by Kelly and MacCallum in the year 1893 however the relationship between the gas formation and infective etiology was not established till 1962, when it was done by infectious pathologists, Schultz and Korean, who also suggested the term emphysematous pyelonephritis (1).

EPN is a urological emergency that needs early medical intervention in order to avoid morbidity and mortality. It is mostly prevalent among adult female (2,3) subjects and adult subjects with diabetes mellitus (4). Diabetes mellitus is seen in up to 95% of cases of EPN (5). It is commonly seen in females than in males, early diagnosis and treatment is possible providing a better outcome (1,6). EPN is also caused due to presence of risk factors like intravenous drug users, Malnutrition study subjects, subjects with neurogenic bladder, alcoholic subjects, and subjects with anatomical abnormalities in urinary tract (1,7).

This study included 30 patients diagnosed with EPN managed aggressively with antibiotics vs double J stenting with antibiotic management and their outcome in ICU stay, antibiotic usage. An excellent outcome was seen in the group managed with drainage procedure in comparison to those managed with antibiotics and fluid management alone.

METHODS:

An experimental randomized controlled study was conducted among the 30 study subjects diagnosed with EPN were included from inpatients of Department of General Surgery and Department of Internal Medicine. The study was conducted over a period of one year from October 2021 to October 2022. The cases with radiological evidence of EPN were included in the study. The study subjects were further randomly divided into two groups according to management. First group consists of study subjects receiving conservative management and other group consists of study subjects

managed with the help of drainage procedure of double J stenting along with empirical medical management.

The clinical profile, lab reports, urinalysis and radiological study of the patients were analyzed. Patients on conservative management were managed on empirical antibiotics, blood sugar control, fluid, and electrolyte management. Patients undergoing Double J stenting underwent anesthesia fitness and were operated followed by an empirical medical management. Duration of ICU stay, duration of antibiotic use and outcome were then compared between the two groups.

The data was recorded using case sheet proforma and further entered into MS-Excel worksheet and analyzed using Statistical package IBM SPSS Statistics 26.0. Between group comparisons were done using independent sample t-test. The level of significance was set at 0.5%. All p-values less than 0.05 were treated as significant.

RESULTS:

The mean age of study subjects managed with conservative management was 53.47 (± 5.43) years and the mean age of study subjects managed using DJ stenting was 52.67 (±6.82) years (figure 1). No significant difference in the mean age of study subjects in two groups was observed (p>.05).

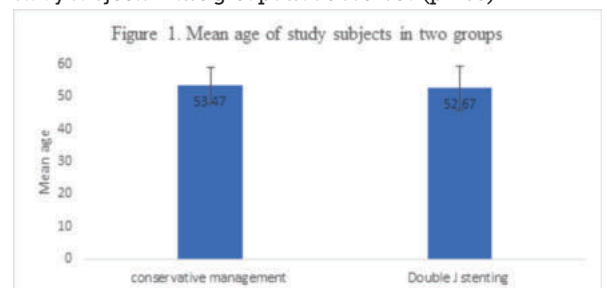


Table 1 indicates the distribution of study subjects according to the symptoms. The study subjects managed with conservative management had symptoms like fever (n=15, 100%), flank pain (n=13, 86.7%), nausea and vomiting (n=12,

80%), Lower urinary tract symptoms (n=10, 66.7%), renal angle tenderness (n=12,80%), and altered sensorium (n=2, 13.3%). The study subjects managed with Double J stenting had symptoms like fever (n=15, 100%), flank pain (n=14, 93.3%), nausea and vomiting (n=12,80%), Lower urinary tract symptoms (n=13, 86.7%), renal angle tenderness (n=12,80%), and altered sensorium (n=1, 6.7%).

Table 1. Distribution according to Symptoms

Symptom	conservative management		Double J stenting	
	n	%	n	%
Fever	15	100.0%	15	100.0%
Flank pain	13	86.7%	14	93.3%
Nausea and Vomiting	12	80.0%	12	80.0%
Lower urinary tract symptoms	10	66.7%	13	86.7%
renal angle tenderness	12	80.0%	12	80.0%
altered sensorium	2	13.3%	1	6.7%

Figure 2 indicates distribution of study subjects according to infection of E. coli, klebsiella and pseudomonas. Out of 15 study subjects managed with conservative management, 11 (73.33%) had E. coli infection in culture while the remaining 4 (26.67%) had klebsiella infection. Amongst the 15 study subjects managed by DJ stenting 8 (53.33%) had E. coli infection and, 6 (40%) had klebsiella infection and 1(6.7%) had pseudomonas infection.

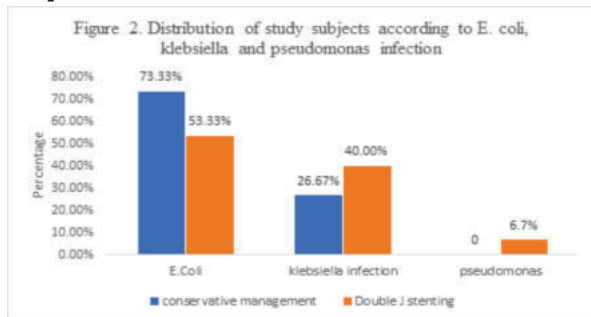


Table 2 and figure 3 indicates Between group comparison of ICU stay, Antibiotic days used and days for discharge. Among study subjects managed with conservative management, the average duration of ICU stay was 8.27 (± 1.16) days as compared to 3.93 (± 1.33) days among study subjects managed with Double J stenting. The duration of stay in ICU among subjects managed with Double J stenting was significantly less as compared to the subjects managed with conservative management (p<.01).

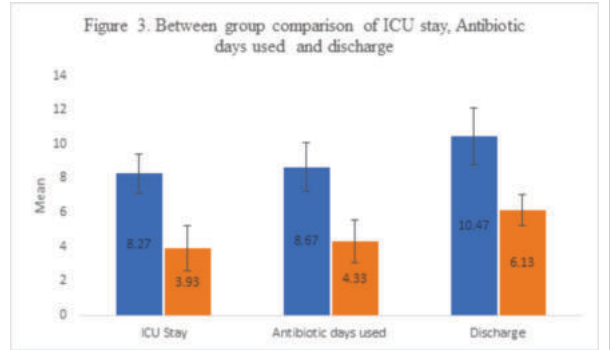
Among study subjects managed with conservative management, the average number of days antibiotic used was 8.67 (± 1.40) days as compared to 4.33 (± 1.23) days among study subjects managed with Double J stenting. The duration of antibiotic used among subjects managed with Double J stenting was significantly less as compared to the subjects managed with conservative management (p<.01).

Among study subjects managed with conservative management, the average days of discharge were 10.47 (± 1.64) days as compared to 6.13 (± 0.92) days among study subjects managed with Double J stenting. The average days of discharge among subjects managed with Double J stenting was significantly less as compared to the subjects managed with conservative management (p<.01).

Table 2. Between group comparison of ICU stay, Antibiotic days used and discharge

Group	N	ICU Stay	Antibiotic days used	Discharge
Conservative	15	8.27 ± 1.16	8.67 ± 1.4	10.47 ± 1.64
DJ Stenting	15	3.93 ± 1.33	4.33 ± 1.23	6.13 ± 0.92
P-value		< 0.001**	< 0.001**	< 0.001**

** : Significant at 1% level of significance



DISCUSSION:

Emphysematous Pyelonephritis (EPN) is an acute necrotizing infection of urinary system caused by gas forming organisms like E. coli and Klebsiella (8). The most common organisms that causes EPN was E. coli followed by Klebsiella (9). In our study it is observed that out of 30 study subjects, 19 (63.33) subjects had E. coli organism, 10 (33.33%) had klebsiella organism and 1 (3.33%) had pseudomonas organism. EPN is generally diagnosed using high clinical suspicion and further it is confirmed with the help of radiological evidence of gas in renal parenchyma.

Clinical management of EPN includes medical management and drainage procedures. The medical management comprises of early empirical usage of antibiotics of broad-spectrum. After the availability of the culture report, the antibiotics are changed accordingly in order to control sugar level, improvement of fluid and electrolyte imbalance, and hemodialysis wherever required. Drainage procedures include PCN and JJ stenting (10,11).

Similar to pyelonephritis, the clinical presentation of EPN included major symptoms like fever, flank pain, nausea and vomiting, lower urinary tract symptoms and altered sensorium. Das D et al. conducted a study among 15 EPN subjects observed that around 80% of EPN subjects had fever, 66.7% subjects had flank pain, 53.3 % had nausea and vomiting, and 6.7% had altered sensorium (1). The results of current study also indicated similar findings.

Several studies indicated better outcome among subjects managed with Double J stenting. The improvement was seen in terms of reduced number of days of ICU stay, reduced days on antibiotics, early discharge and better outcome (10,11). The results of current study indicated that among study subjects managed with Double J stenting there is lesser morbidity in terms of the number of days of hospital stay, days on antibiotic and overall admission days was significantly less as compared to the subjects managed with conservative management.

CONCLUSION:

The results of our study indicated that DJ stenting procedure with medical management results in better outcome as compared to the conservative management. It is concluded that the study subjects who underwent DJ stenting with medical management had reduced morbidity and mortality in terms of ICU stay, Antibiotic used and decreased hospital stay in comparison to those managed by conservative management alone. We suggest DJ stenting procedure with medical management as it can be done endoscopically and results in better outcome in terms of less morbidity for the subjects.

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