

Endourologic Management in Neglected Double J Stent at Soetomo Hospital Surabaya Retrospective-Descriptive Study, Periode 2013-2016

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ENDOUROLOGIC MANAGEMENT IN NEGLECTED DOUBLE J STENT AT SOETOMO HOSPITAL SURABAYA RETROSPECTIVE-DESCRIPTIVE STUDY, PERIODE 2013-2016

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ABSTRACT

Objective: The use of various combinations of endourological techniques can be an effective solution in the management of neglected DJ stent. The variety of treatments that combine the extracorporeal shock wave lithotripsy (ESWL), retrograde cortolithotripsy (CLT) ureteroscopy with intracorporeal lithotripsy, percutaneous nephrolithotomy (PCNL) and open surgery have been used for the management of encrustation stent cases in a neglected DJ stent. **Material & Methods:** A Retrospective descriptive study by evaluating patients that have done undergoing endourological measures in the case of Neglected DJ stents in Soetomo General Hospital from January 2013 to December 2016. Data analysis based on age, gender, location of encrustation, indication of DJ stent insertion, duration of DJ stent insertion, and type of endourologic management. **Results:** In this study, the data of patients undergoing endourological action in Neglected DJ stent cases were 29 patients from January 2012 to December 2016. In Neglected DJ stent patients (41.4%) 12 were encrusted and (58.6%) 17 that there is no encrustation. From 29 patients neglected DJ stent, consisting of (20.7%) 6 males and (79.3%) 23 females, with ratio male to female 1:4, the incidence of DJ stent encrustation was 12 with ratio male to female 1:1, with ages ranging from 41-64 years. The most common cause of DJ stent insertion in Neglected DJ stent patients was malignancy that cause obstructive uropathy (72.4%) 2, all of them were female patients, followed by ureteral stones (24.1%) 7, where males (13.8%) 4 and women (10.3%) 3, and UPJ stenosis where there were only (3.4%) 1 men. In the neglected dentist stent there were 62 (62%) 18 unilateral stent (males (13.8%) 4 and female (48.3%) 14 while the bilateral stent were (37.9%) 11, where male (6.9%) 2 and female (31%) 9. Duration of DJ stent use in neglected DJ stent is higher in 15 weeks (20.7%) 6, followed by 17 weeks (17.2%) 5, 14 weeks (13.8%) 4, 16 weeks, 18 weeks, 20 weeks each (10.3%) 3, 13 weeks (6.9%) 2, and last order during 19 weeks, 26 weeks, 29 weeks each (3.4%) 1. Where the largest organ there is encrustation is Ureter (24.1%) 7, followed by renal with a kidney (10.3%) 3. After which the kidneys with ureter (3.4%) 1 and buli (3.4%) 1. Management of Neglected DJ stent without encrustation performed procedure of removing DJ stent 17 (58.6%), while management of Neglected DJ stent with stent encrustation. The majority procedure was URS (13.8%) 4, followed by URS + PCNL and ESWL pre op + URS respectively (6.9%) 2, and few with ESWL preoperative procedures, CLT, CLT + PCNL, and ESWL pre operation + CLT + PCNL about (3.4%) 1. **Conclusion:** The neglected ratio male to female 1:4, while the incidence of DJ stent encrustation was 12 with ratio male to female 1:11. The most common cause of DJ stent insertion in Neglected DJ stent patients was malignancy that cause obstructive uropathy, followed by ureteral stones and UPJ stenosis. Patients with unilateral DJ stent more than those with bilateral DJ stent. Duration of DJ stent usage in Neglected DJ stent at most for 15 weeks and last order for 19-29 weeks. In Neglected DJ patients the patient incrustation ratio and no incrustation were 2:3. Management of the Neglected DJ stent without encrustation is performed by DJ stent with cystoscopy, while the management of the Neglected DJ stent with encrustation is performed with a multimodal endourology procedure, among others: a combination of URS, PCNL, ESWL pre-op and CLT. The most commonly organ that have encrustation is the ureter, the second sequence is the bladder with the kidney, and finally the kidney with the ureter and the bladder.

Keywords: Neglected DJ stent, encrustation, endourology.

ABSTRAK

Objective: Penggunaan berbagai kombinasi endourological teknik dapat merupakan solusi dalam penatalaksanaan kasus neglected stent yang efektif. Berbagai metode kombinasi pengobatan dari extracorporeal shock wave lithotripsy (ESWL), cystolithotripsy (CLT) retrograde ureteroscopy dengan intracorporeal lithotripsy, percutan nephrolithotomy (PCNL) dan operasi terbuka telah digunakan untuk penatalaksanaan kasus enkrustasi pada neglected DJ stent. **Bahan & Cara:** Retrospektif deskriptif dengan mengevaluasi pasien yang dirawat dan menjalani tindakan endourologi pada kasus Neglected DJ stent di RSUD Dr. Soetomo dari bulan Januari 2013 sampai Desember 2016. Analisis data dilakukan berdasarkan usia, jenis kelamin, lokasi enkrustasi, indikasi, durasi insersi DJ stent, dan jenis penatalaksanaan endourologi. **Hasil:** Pada penelitian ini diperoleh data pasien yang menjalani tindakan endourologi pada kasus Neglected

DJ stent sebanyak 29 pasien dari periode Januari 2012 sampai dengan Desember 2016. Pada pasien Neglected DJ stent terdapat (41.4%) 12 yang enkrustasi dan (58.6%) 17 yang tidak ada enkrustasi. Dari 29 pasien neglected DJ stent, terdiri dari (20.7%) 6 laki-laki dan (79.3%) 23 perempuan, dengan rasio laki-laki dan perempuan 1:4, pasien yang terjadi enkrustasi DJ stent berjumlah 12 dengan rasio laki-laki dan perempuan 1:1, dengan usia berkisar antara usia 41 tahun sampai 64 tahun. Penyebab terbanyak indikasi pemasangan DJ stent pada pasien Neglected DJ stent adalah malignansi yang menyebabkan uropathy obstruktif sebanyak (72.4 %) 2, dimana semuanya adalah pasien perempuan, disusul oleh batu ureter (24.1%) 7, dimana laki-laki (13.8%) 4 dan perempuan (10.3%) 3, dan UPJ stenosis dimana hanya ada (3.4%) 1 laki-laki. Pada pasien neglected DJ stent yang terpasang DJ stent unilateral sebanyak (62%) 18, dimana laki-laki (13.8%) 4 dan perempuan (48.3%) 14 sedangkan yang terpasang DJ stent bilateral sebanyak (37.9%) 11, dimana laki-laki (6.9%) 2 dan perempuan (31%) 9. Lama pemakaian DJ stent pada Neglected DJ stent paling banyak yakni selama 15 minggu (20.7%) 6, lalu disusul selama 17 minggu (17.2%) 5, 14 minggu (13.8%) 4, 16 minggu, 18 minggu, 20 minggu masing-masing ada (10.3%) 3, 13 minggu (6.9%) 2, dan urutan terakhir selama 19 minggu, 26 minggu, 29 minggu masing-masing ada (3.4%) 1. Dimana organ yang paling banyak terdapat enkrustasi adalah ureter (24.1%) 7, disusul dengan buli dengan ginjal (10.3%) 3, setelah itu ginjal dengan ureter (3.4%) 1 dan buli (3.4%) 1. Penatalaksanaan Neglected DJ stent tanpa enkrustasi dilakukan prosedur ganti/lepas DJ stent 17 (58.6%), sedangkan penatalaksanaan Neglected DJ stent dengan enkrustasi mayoritas dilakukan prosedur URS (13.8%) 4, disusul dengan URS + PCNL dan ESWL pre op + URS masing-masing (6.9%) 2, dan terakhir dengan prosedur ESWL pre operasi, CLT, CLT + PCNL, dan ESWL pre operasi + CLT + PCNL dimana masing-masing (3.4%) 1. **Simpulan:** Rasio neglected DJ stent laki-laki dan perempuan 1:1. Penyebab terbanyak indikasi pemasangan DJ stent pada pasien Neglected DJ stent adalah malignansi yang menyebabkan uropathy obstruktif, disusul oleh batu ureter dan UPJ stenosis. Pada pasien DJ stent unilateral lebih banyak dibandingkan yang terpasang DJ stent bilateral. Lama pemakaian DJ stent pada Neglected DJ stent paling banyak yakni selama 15 minggu dan urutan terakhir selama 19-29 minggu. Pada pasien Neglected DJ stent rasio pasien yang enkrustasi dan tidak ada enkrustasi yakni 2:3. Penatalaksanaan Neglected DJ stent tanpa enkrustasi dilakukan prosedur ganti/lepas DJ stent, sedangkan penatalaksanaan Neglected DJ stent dengan enkrustasi mayoritas dilakukan prosedur endourologi secara multimodal, antara lain: kombinasi antara URS, PCNL, ESWL pre op dan CLT. Organ yang paling banyak terdapat enkrustasi adalah ureter, urutan kedua adalah buli dengan ginjal, dan urutan terakhir yakni ginjal dengan ureter dan buli.

Kata Kunci: Neglected DJ stent, enkrustasi, endourologi.

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INTRODUCTION

The high use of DJ stent in the field of urology raises the high complications associated DJ stent. These complications include stent incrustation, stent fragmentation, stone formation and recurrent urinary tract infections.^{1,2} Cases of the neglected ureteral stent are common due to poor patient's poor adherence to routine control to the physician.³ Incrustation in cases neglected DJ stent often causes life-threatening complications and is a challenge for urologists to cope with the case. Other factors involved in increased incidence of encrustations are chronic recurrent stone formers, predisposing metabolic stones, congenital renal anomalies, malignant urinary obstruction and pregnancy.⁴ Fragmentation is another important complication of the neglected stent. This is the result of the loss of elastic strength of the stent caused by

calcification and degeneration of the stent polymer.⁵ The risk of incrustation and fragmentation depends on the type of stent material. Research conducted El faqih et al., found a crust that increased from 9.2% at <6 weeks to 47.5% at six to 12 weeks for 76.3% at >12 weeks' dwelling time.⁶ Research conducted by Singh et al., described some of the management of neglected stent cases with various approaches including open surgery.⁷

Borboroglu et al. also reported four patients' endourological treatment with a case of neglected stents with large stone encrustation. All patients required 2-6 endourological approach (average 4.2) performed on one or more sessions to achieve free-stone and stent free figures. These authors conclude that nephrolithotomy (PCNL) and ureteroscopy claims are often used in cases of neglected stents with large stone encrustations.⁸ Bukkapatnam et al. reported that of 11 patients, 10 patients were

administered by ureteroscopy alone and in one patient PCNL.⁹ The stent encrustation rate was dependent on the length of time the DJ stent was used. Various authors have reported that the safety level of DJ stents is between 2-4 months.^{3,6} For patients requiring a stent beyond this period, prophylactic antibiotics are required and stent replacement should be done routinely.^{3,6} The use of various combinations of endourological techniques can be a solution in the management of effective neglected stent cases. Various methods of combination treatment from extracorporeal shock wave lithotripsy (SWL), cystolithotripsy (CLT) retrograde ureteroscopy with intracorporeal lithotripsy, percutaneous nephrolithotomy (PCNL) and open surgery have been used for the retrieval of this stent studded.^{8,10-14} Given the lack of data on management in patients neglected DJ stent in Indonesia, this led us to conduct a descriptive retrospective study to determine the management of endourology in patients neglected DJ stent in Soetomo General Hospital from January 2013 to December 2016. The results of this study are also expected to be used as inputs to carry out research and management of case neglected DJ stents with deeper and wider coverage.

OBJECTIVE

The use of various combinations of endourological techniques can be an effective solution in the management of neglected DJ stent. The variety of treatments that combine the extracorporeal shock wave lithotripsy (ESWL), retrograde cortolithotripsy (CLT) ureteroscopy with intracorporeal lithotripsy, percutaneous nephrolithotomy (PCNL) and open surgery have been used for the management of encrustation stent cases in a neglected DJ stent.

MATERIAL & METHODS

This research is a retrospective descriptive research. The research data obtained will be presented descriptively in the form of pictures, tables, and narration. This research was conducted in Soetomo General Hospital in February 2017 for approximately 4 months. The samples in this study were all patients treated and underwent endourological action in the case of Neglected DJ stents in Soetomo General Hospital from January 2013 to December 2016. The data was collected by

searching the operation book at GBPT Soetomo General Hospital and searching the registration number of patients undergoing endourological action in case of the Neglected DJ stent from various genders, age and etiology treated in Soetomo General Hospital from January 2013 to December 2016. The inclusion criteria in this study are: patients diagnosed with Neglected DJ stent, patients with PS ASA 1-3, with general anesthesia, patients with a history of DJ stent installation of size 6 Fr endorologically. Exclusion criteria in this research are: patients who are installed DJ stents are open operation and hepatic phenomena hemostasis.

RESULTS

In this study, data obtained patients who undergo endourology action in cases of Neglected DJ stent as much as 29 patients from January 2012 until December 2016. In Neglected DJ stent patients (41.4%) 12 patients were encrusted and (58.6%) 17 patients had no encrustation. Management of the Neglected DJ stent without encrustation was performed by DJ stent 17 (58.6%), while the management of the Neglected DJ stent with majority encrustation performed URS procedure (13.8%) 4 patients, followed by URS + PCNL and ESWL pre op+URS respectively (6.9%) 2 patients, and lastly with preoperative ESWL procedures, Lithotepadical Cystoscopy (CLT), CLT + PCNL, and ESWL pre operation + CLT + PCNL were respectively (3.4%) 1 patient.

In Neglected DJ stent patients (41.4%) 12 patients were encrusted and (58.6%) 17 patients did not have encrustation. Where the most common organ there is encrustation is Ureter (24.1%) 7 patients, followed by renal with kidney (10.3%) 3 patient, then kidney with ureter (3.4%) 1 patient and buli (3.4%) 1 patient.

Of the 29 patients with neglected DJ stent, consisting of 20.7% of 6 male patients and 79.3% of 23 patients, with a male and female ratio of 1:4, the patient with DJ stent encrustation was 12 Patients, (6 male patients and 6 female patients), with a male and female ratio of 1:1, with ages ranging between the ages of 41 years to 64 years.

The most common cause of DJ stent in Neglected DJ stent patients was malignancy causing obstructive uropathy (72.4%) of 21 patients, all of whom were female patients, followed by ureteral stones (24.1%) of 7 patients, (13.8%) 4 patients and women (10.3%) 3 patients, and UPJ stenosis where there were only (3.4%) 1 male patient.

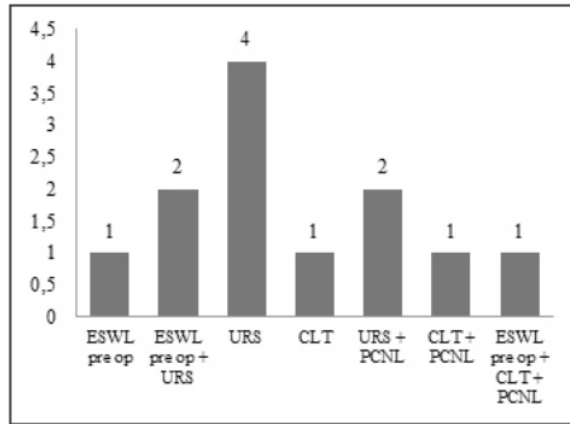


Figure 1. Procedure of Endourology in Neglected DJ stent patient.

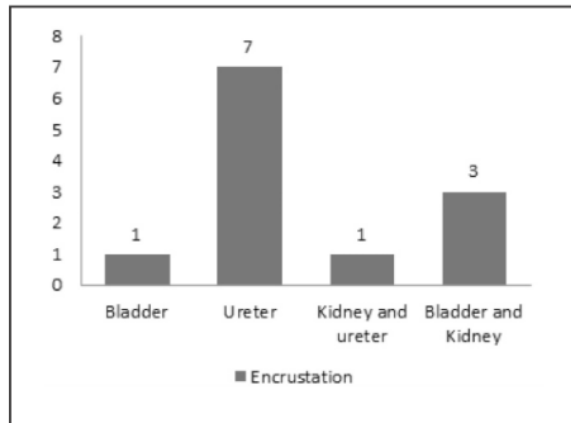


Figure 2. Encrustation at Organ site in Neglected DJ stent Patient.

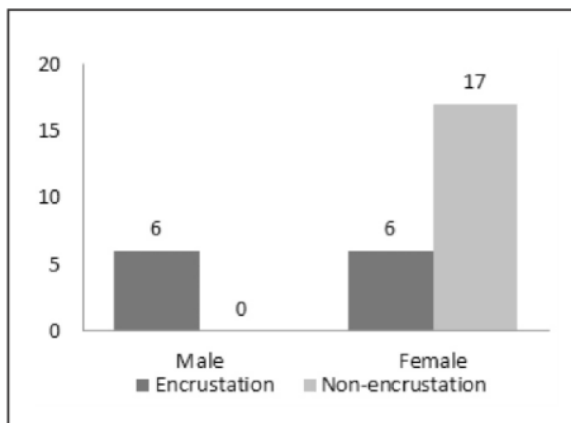


Figure 3. Encrustation by gender in Neglected DJ stent Patient.

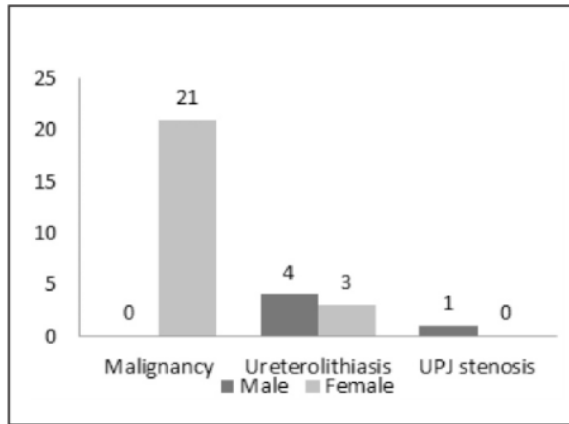


Figure 4. Indication of inserting DJ stent by gender in Neglected DJ stent Patient.

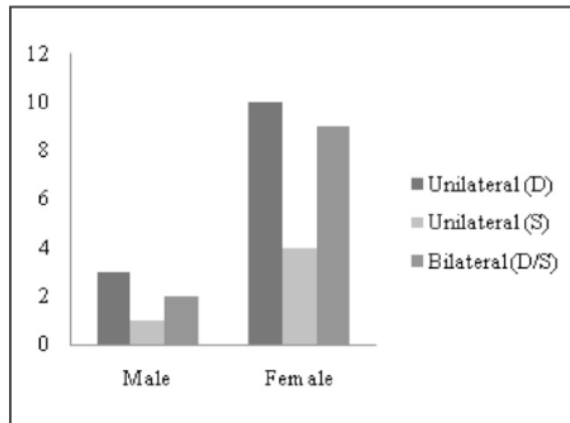


Figure 5. Site of stent insertion by gender in Neglected DJ stent Patient.

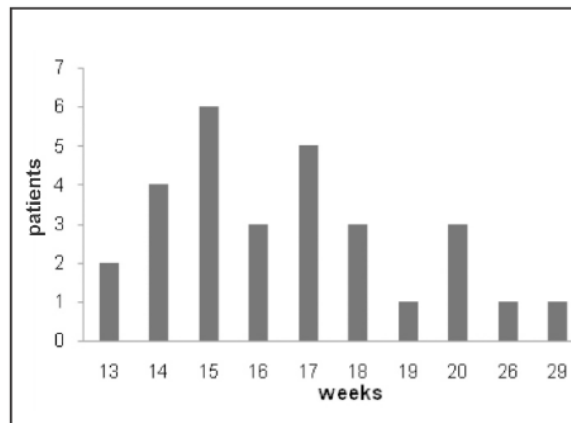


Figure 6. Duration of indwelling stent in Neglected DJ stent Patient

In patients with neglected dentist stent unilateral Dent stent (62%) of 18 patients, where men (13.8%) 4 patients and women (48.3%) 14 patients, whereas bilateral stents attached DJs (37, 9%) 11 patients, of which male (6.9%) 2 patients and women (31%) 9 patients.

Duration of indwelling stent in Neglected DJ stent patient for 15 weeks (20.7%) 6 patients, followed by 17 weeks (17.2%) 5 patients, 14 weeks (13.8%) 4 patients, 16 weeks, 18 weeks, 20 weeks each (10,3%) 3 patients, 13 weeks (6.9%) 2 patients, and last order for 19 weeks, 26 weeks, 29 weeks each (3.4%) 1 patient.

DISCUSSION

Increased use of DJ stents in the field of urology leads to high complications associated with DJ stents. These complications include stent encrustation, stent fragmentation, stone formation, and recurrent urinary tract infections.

Case neglected stent ureter often occurs because of poor patient's poor compliance level for routine control to the doctor.³ Incrustation in cases neglected DJ stent often causes life-threatening complications and is a challenge for urologists to cope with the case. Other factors involved in increased incidence of encrustations are chronic recurrent stone formers, predisposing metabolic stones, congenital renal anomalies, malignant urinary obstruction and pregnancy.⁴

Extracorporeal shock wave lithotripsy (ESWL) is an initial treatment with a stent with a minimum (encrustation) crust. If no visible encrustations are present on radiographic plain films, our approach is cystoscopic release using pincerized pliers with local anesthesia. The next stage is CLT with the help of pneumatic lithotripter on the stent with minimal crust and followed by a mild tug under the guidance of fluoroscopy. If the cystoscopic approach fails, and in the patient there is a stent encrustation in the ureter, then URS is performed with a guidewire passed along the stent. Stent encrustation can be fragmented with pneumatic or laser lithotripter, while carefully forwarding the ureteroscope into the renal pelvis. After all the encrustation has been fragmented, the DJ stent can be pulled slowly with the help of a guiding pouch guided by ureteroscope and fluoroscopic. If there are signs of ureteral trauma or contrast extravasation, the patient should be re-stent stressed.

Neglected DJ stent may cause considerable morbidity to the risk of death, due to the large extent of incrustation with significant stones.^{23,24} DJ stent encrustation associated with large stones is a serious problem, due to complications such as recurrent urinary tract infections, haematuria, obstruction and failure Kidney.²⁵ The incidence of encrustation in neglected DJ stents may occur in urine, both infected and sterile. The mechanism of the formation of DJ stent encrustation in the infected urine is the result of organic components in the urine that crystallize and exit to the surface of the biomaterial and into a layer of bacterial biofilm. Urease is produced by bacteria capable of hydrolyzing urea to produce ammonia. This causes an increase in urine pH to become more alkaline, thereby facilitating the deposition of magnesium and calcium as struvite and hydroxyl apatite.^{26,27} Although the exact mechanism of the crust in the sterile urine is unclear, But all factors depend on urine pH, ionic strength and hydrophobic biomateriality.²⁸ The degree of severity of the incrustation depends on the length of the DJ stent (indwelling time) installation. El faqih et al. Found a crust that increased from 9.2% at <6 weeks to 47.5% at six to 12 weeks for 76.3% at >12 weeks' dwelling time.²⁹ Other factors involved in increased incidence of encrustations were stone formers repetitive chronic, predisposing metabolic stones, congenital renal anomalies, malignant urinary obstruction and pregnancy.³⁰

The risk of crust and fragmentation depends on the type of stent material. Silicon was found crust-prone, followed by polyurethane, silitek, percuflax and polyurethane coated hydrogel.³¹ All patients neglected DJ stents in this study had stents made of polyurethane material. Very often, some endourological approaches are needed because of the encrustation and the stones that appear on the jars, ureters, and kidneys. Therefore, the management of encrustation in the case of neglected DJ stent requires a single or multiple endourological to the possibility of open surgery. Singh et al. describes several endourological approaches including open surgery to address the encrustation at neglected DJ stent.³²

Borboroglu et al. also reported four patients' endourological treatment with severe encrustation of the ureteral stent. All patients required 2-6 endourological approaches (averaged 4.2) performed on one or more sessions, to achieve the free number of stones or encrustation in the case of neglected DJ stents. These authors conclude that

percutaneous nephrolithotomy and ureteroscopy are often necessary to overcome the encrustation in cases neglected DJ stent.³³

Murthy et al. studied 14 patients (11 men and 3 women) with neglected ureter stents with an average stent usage time of 4.9 years (range 1 to 12). In seven patients, all neglected stents, in three patients the encrustation was limited to the ureter and the distal (distal) part of the stent, the two patients had encrustation of the distal stent DJ, and minimal incrustation was present in two patients. PCNL was performed in 5 cases and retrograde ureteroscopy with lithotripsy in 9 patients. Cystolithotripsy was used to treat the incrustation of distal stents in eight patients. The release of the stent in the cystoscopic minimal encrustation case has two cases. Looscopy and stent release were performed on one patient with ileal channel and retained the stent. Only one patient performed an open surgical release of the stent.³⁴

Rahul Devraj et al. researched a total of 30 patient records analyzed during the period from January 2013 to January 2016. Of which 18 (60%) were male and 12 (40%) were female. Age ranges from 7 years to 63 years (mean 44 ± 10 years). The duration of DJ stent in situ is in the range of 1-9 years (Mean 3.5 ± 1.06 years). Complications ranging from waist pain 11 (36.6%), dysuria 6 (20%), hematuria 6 (20%), LUTS irritation at 5 (16.6), and no symptoms in 2 (6%) among patients recorded. Of the 30 patients, 5 (16.6%) patients performed CLT, 2 (6%) patients were PCNL, 3 (9%) underwent open surgery. Of the 30 patients, 17 patients (56%) had severe incrustation in both kidneys and jars, 5 (16.6%) patients had renal or bile encrustation, 4 (13%) had a fracture stent 2 (6%) patients Underwent PCNL, 5 (16.6%) patients received CLT and in 4 (12%) cystoscopy patients and DJ removal were performed. Only 3 patients were 9% performed open surgery, each with pyelolithotomy, vesikolitotomi+pielolitotomi and nephrectomy. Complications occur in 4 patients: Two patients with sepsis and two patients with bleeding.³⁵ Uterine stroke DJ has a duration of 4-12 weeks used to prevent or relieve obstruction of upper urinary tract and reconstruction surgery procedure. The incrustation is distal to the DJ stent/bladder stent J, but it is better treated with lithotriptic cystoscopy.³⁵

According to Matthew F. Bultitude et al., of the 49 patients who neglected DJ stent, 41 patients had the encrustation. Of these, 75.5% of the patients had encrustation, with DJ stent for 6 months and

42.8% in 4 months of DJ stent use. The average time for DJ stents was 5.6 months. A total of 47 stents were removed by the endourologic technique, with 4 patients requiring extracorporeal shock wave lithotripsy alone, 28 patients with ureteroscopy, and 10 combinations of both. 5 patients underwent PCNL and 1 patient underwent open surgery.³⁶

In this study, we obtained data of patients undergoing endourological action in Neglected DJ stent cases of 29 patients from January 2012 to December 2016. In Neglected DJ stent patients (41.4%) 12 patients were encrusted and (58.6%) 17 patients with no incrustation. Management of the Neglected DJ stent without incrustation was performed by DJ stent 17 (58.6%), while the management of the Neglected DJ stent with majority encrustation performed URS procedure (13.8%) 4 patients, followed by URS + PCNL and ESWL pre op + URS respectively (6.9%) 2 patients, and lastly with preoperative ESWL procedures, Lithotepadical Cystoscopy (CLT), CLT + PCNL, and ESWL pre operation + CLT + PCNL were respectively (3.4%) 1 patient. In Neglected DJ stent patients (41.4%) 12 patients were encrusted and (58.6%) 17 patients had no encrustation. Where the most common organ there is encrustation is Ureter (24.1%) 7 patients, followed by renal with kidney (10.3%) 3 patient, then kidney with ureter (3.4%) 1 patient and buli (3.4%) 1 patient. Of 29 patients neglected DJ stent, consisting of (20.7%) 6 male patients and (79.3%) 23 female patients, with a male and female ratio of 1:4, patients incident DJ stent increase amounted to 12 Patients, (6 male patients and 6 female patients), with a male and female ratio of 1:1, with ages ranging between the ages of 41 years to 64 years.

The most common cause of DJ stent in Neglected DJ stent patients was malignancy causing obstructive uropathy (72.4%) of 21 patients, all of whom were female patients, followed by ureteral stones (24.1%) of 7 patients, (13.8%) 4 patients and women (10.3%) 3 patients, and UPJ stenosis where there were only (3.4%) 1 male patient. In patients with neglected dentist stent unilateral Dent stent (62%) of 18 patients, where men (13.8%) 4 patients and women (48.3%) 14 patients, whereas bilateral stents attached DJs (37.9%) 11 patients, of which male (6.9%) 2 patients and women (31%) 9 patients. Duration of DJ stent use in Neglected DJ stent at most for 15 weeks (20.7%) 6 patients, followed by 17 weeks (17.2%) 5 patients, 14 weeks (13.8%) 4 patients, 16 weeks, 18 weeks, 20 weeks each (10,3%) 3 patients, 13 weeks (6.9%) 2 patients, and

last order for 19 weeks, 26 weeks, 29 weeks each (3.4%) 1 patient.

CONCLUSION

The neglected ratio male to female 1:4, while the incidence of DJ stent encrustation was 12 with ratio male to female 1:11. The most common cause of DJ stent insertion in Neglected DJ stent patients was malignancy that cause obstructive uropathy, followed by ureteral stones and UPJ stenosis Patients with unilateral DJ stent more than those with bilateral DJ stent. Duration of DJ stent usage in Neglected DJ stent at most for 15 weeks and last order for 19-29 weeks. In Neglected DJ patients the patient's incrustation ratio and no incrustation were 2:3.

Management of the Neglected DJ stent without encrustation is performed by DJ stent with cystoscopy, while the management of the Neglected DJ stent with encrustation is performed with a multimodal endourology procedure, among others: a combination of URS, PCNL, ESWL pre-op, and CLT. The most commonly organ that have encrustation is the ureter, the second sequence is the bladder with the kidney, and finally the kidney with the ureter and the bladder.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9
