



## Original article

### A Retrospective, Comparative Study of Ureteric Stent Registry Systems And Review of Hospital Policy to Minimize Incidence of Forgotten Stents

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#### ABSTRACT

**Introduction:** Based upon experiences from our previously conducted hospital audit of old ureteric stent registry system and after reviewing other studies, we introduced a new ureteric stent registry system from 1<sup>st</sup> April, 2014. The current study was conducted to evaluate the feasibility of new ureteric stent registry system and review hospital policy to address the problem. **Materials and methods:** In the current study, data from old stent registry system (1<sup>st</sup> April to 30<sup>th</sup> September, 2013) and new stent registry system (1<sup>st</sup> April to 30<sup>th</sup> September, 2014) were compared retrospectively. We have analysed our ureteric stent logbooks, theatre logs, discharge certificates and computerised stent registry data of every patients and where no record of stent removal was found, we contacted the patient. **Results:** Old ureteric stent registry system failed to record 27.3% cases of stent removal, where as new registry system failed only in 1.3% cases. Because of new stent registry system, delayed stent removal incidence was reduced from 22.8% to 3% and stent associated complications were decreased from 9.7% to 1.3% (P value <0.0001). **Conclusion:** Our current ureteric stent registry system which is properly maintained and regularly monitored is more effective safeguard than old ureteric stent registry system to minimize incidence of forgotten stents and stent related complications.

**KEYWORDS:** Forgotten stent, Ureteric stent, Stent registry.

#### INTRODUCTION

Though ureteric stents play an essential role in different urological procedures, complications associated with forgotten stents are well documented in various literatures [1]. These complications have varied from minor side effects such as hematuria, dysuria, increased frequency of urination and suprapubic pain to major complications such as vesico-ureteric reflux, stent migration, encrustation, urinary infection, stent fracture and ureteroarterial fistula [2]. Based upon experiences from our previously conducted hospital audit of old ureteric stent registry system and after reviewing other studies [3,4], we introduced a new ureteric stent registry system from 1<sup>st</sup> April, 2014. The current study was conducted to evaluate the feasibility of new ureteric stent registry system and review hospital policy to address the problem.

#### MATERIALS AND METHODS

In the current study, data from old stent registry system (1<sup>st</sup> April to 30<sup>th</sup> September, 2013) and new stent registry system (1<sup>st</sup> April to 30<sup>th</sup> September, 2014) were compared retrospectively. We analysed our ureteric stent logbooks, theatre logs, discharge certificates and computerised stent registry data of every patient and where no record of stent removal was found, we contacted the patient. Patients who had ureteric stent insertion in other hospital & came to our institution only for stent removal were excluded from the study population. Approval for the study was taken from the Institutional Ethical Committee and Scientific Committee. Chi-squared test with Yates correction was used to compare categorical variables among two groups. Student's t test was used to compare numerical variables. P value of <0.05 was taken as significant.

## RESULTS

In our study, total number of cases in old registry system and new registry system were 154 and 234 respectively. Urolithiasis was most common indication of ureteric stenting followed by stricture, PUJ obstruction, extrinsic compression and urological cancer (Table 1).

We reviewed our ureteric stent registry and identified the patients who had no record of stent removal. Old registry system had 42 (27.3%) presumed “forgotten” stents (Table 2) where as new stent registry system had only 3 (1.3%). Our new registry system was more effective in keeping stent removal record than old registry system (P value <0.0001, Chi-squared test with Yates correction). All the presumed “forgotten” stents were traced by contacting the patient via telephone. Many of them were removed in our hospital

without data entry (Table 3). Number of stent removal in our hospital in old and new registry system was 145 and 231 respectively. Delay in stent removal was noted in 22.8% and 3% in old and new registry system respectively (Table 4). Number of delayed stent removal was significantly less (P value <0.0001, Chi-squared test with Yates correction) in new registry system than old one.

The mean delay from the prescribed date of stent removal was 26.71 days and 8.43 days in old and new registry groups respectively (P value <0.0001, Student’s t test). Urinary tract infection (UTI) was most common stent associated complication (Table 5). Because of new stent registry system, stent associated complications were decreased from 9.7% to 1.3% (P value <0.0001, Chi-squared test with Yates correction).

**Table 1: Indications of ureteric stenting**

Indications of stenting	Old registry	New registry	P value
Urolithiasis	125 (81.2%)	182 (77.8%)	0.499
Stricture	12 (7.8%)	24 (10.3%)	0.522
PUJ obstruction	8 (5.2%)	14 (5.9%)	0.917
Extrinsic compression	5 (3.2%)	8 (3.4%)	0.927
Urological cancer	4 (2.6%)	6 (2.6%)	0.984
Total	154 (100%)	234 (100%)	

**Table 2: Stent removal record in both registry systems**

Stent removal record	Old registry	New registry
Available	112 (72.7%)	231 (98.7%)
Not available (Forgotten stent)	42 (27.3%)	3 (1.3%)
Total	154 (100%)	234 (100%)

P value <0.0001, Chi-squared test with Yates correction

**Table 3: Status of presumed “forgotten” stents.**

Status of forgotten stents	Old registry	New registry	P value
Removed in our hospital	33 (78.6%)	0 (0%)	0.022
Removed in other hospital	2 (4.8%)	0 (0%)	0.699
Died with stent in-situ	3 (7.1%)	2 (66.7%)	0.027
Could not be contacted	4 (9.5%)	1 (33.3%)	0.751
Total	42 (100%)	3 (100%)	

**Table 4: Delayed stent removal in two registry systems.**

Stent removal	Old registry	New registry
Delayed	33 (22.8%)	7 (3%)
Not delayed	112 (77.2%)	224 (97%)
Total	145 (100%)	231 (100%)

P value <0.0001, Chi-squared test with Yates correction

**Table 5: Stent associated complications.**

Complications	Old registry	New registry	P value
UTI	9 (64.3%)	2 (66.7%)	0.938
Stent migration	3 (21.4%)	1 (33.3%)	0.659
Encrustation	2 (14.3%)	0 (0%)	0.486
Total	14 (100%)	3 (100%)	

**DISCUSSION**

Retained DJ stents not only cause increased morbidity, but can also be of significant medico-legal importance. Proper patient counselling is needed during the hospital stay as well as during follow up period to make the patient and party aware of the possible consequences of retained ureteric stents. Accurate record keeping in the form of well-maintained logbooks as well as stent cards issued to patients have been tried in the past [5].

A computerized tracking registry was initially proposed by Monga et al.[6]. Similarly, a computerized ureteric stent retrieval system was described by McCahy and Ramsden [3] and they reported a reduction of late stent removal from

3.6% to 1.1%. This system relied on surgeon completing a paper form, from which information about the stent and removal date was transferred to a computer database by administrative staff. Ather et al. also described a computerized system where all stent insertions were recorded and patients were sent reminders if they failed to return 2 weeks prior to the due date [4]. They reported reduction of overdue stents from 12.5% to 1.2%. Based upon experiences from our previously conducted hospital audit of old ureteric stent registry system and after reviewing other studies [3,4], we made many changes in our stent registry system (Summarized in Table 6).

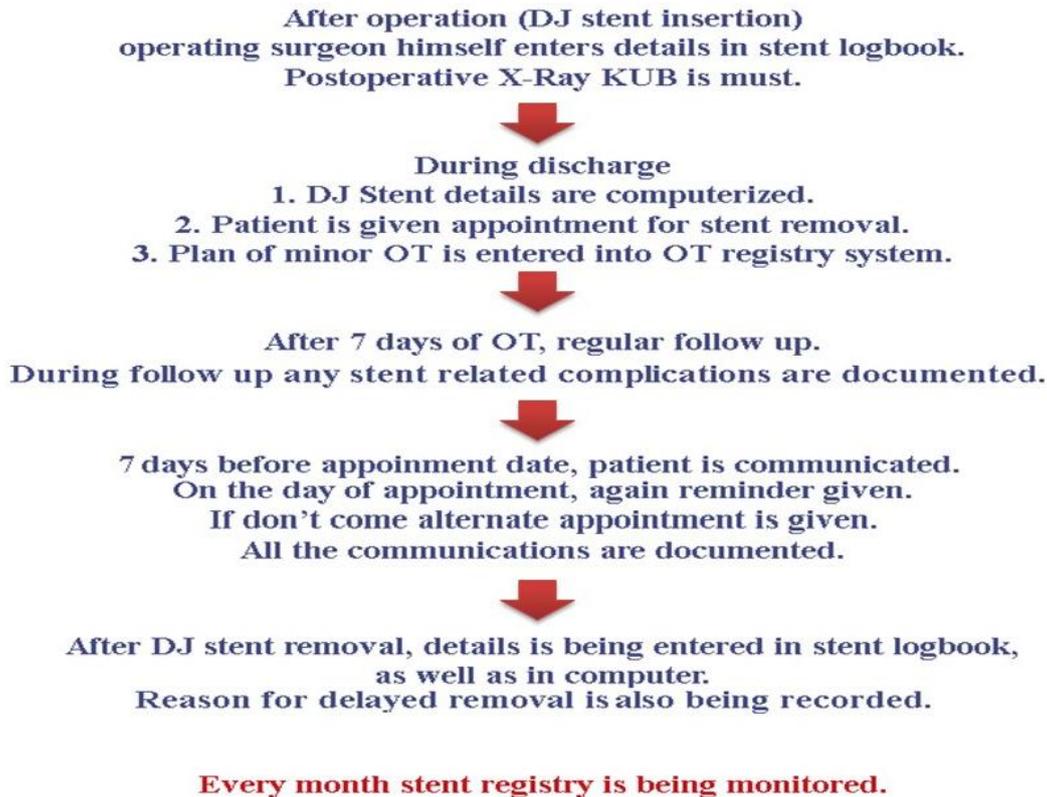
**Table 6: Differences in old and new stent registry systems**

<b>Old registry system</b>	<b>New registry system</b>
Stent logbook was maintained by nurses.	Stent logbook is being maintained by operating surgeons.
No computerized data maintenance.	During discharge all stent registry data is being computerized.
No specific hospital policy to communicate with patients after DJ stent insertion.	All the patients are being communicated regularly for removal of stent on prescribed date and such communication is being recorded.
Only one contact number of patient was in register.	At least two contact numbers are being taken from all patients.
Stent registry was not being monitored regularly.	Stent registry is being monitored regularly.
No record maintenance of reason for delayed stent removal.	Reason for delayed stent removal is being recorded.

Because of new stent registry system, delayed stent removal incidence was reduced from 22.8% to 3% and stent associated complications were decreased from 9.7% to 1.3% (P value <0.0001). Sabharwal S et al. described a computer based stent registry with patient directed automated SMS

and letter generator [7]. Issuing a letter is practically not possible in our hospital as we get many patients from hilly and distant part of the north east states. Functioning of our current stent registry system is summarized in Figure1.

**Figure 1: Functioning of new stent registry system**



## CONCLUSION

Our current ureteric stent registry system which is properly maintained and regularly monitored is more effective safeguard than old ureteric stent registry system to minimize incidence of forgotten stents. It also significantly reduced incidence of delayed stent removal and stent related complications.

**Conflicts of Interest:** NIL

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