ORIGINAL ARTICLE

Dormia Basket versus Extraction Balloon in Proximally Migrated Biliary Stents

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Abstract

Objective: To compare balloon extraction versus Dormia basket in the retrieval of proximally migrated stent.

Methods: The prospective study was conducted at Tanta University Hospital and Kafrelsheikh University Hospital, Egypt, from December 2019 to December 2020, and comprised adult patients of either gender who presented with proximally migrated biliary plastic stent who were evaluated with respect to risk factor for migration. The difference in efficacy of and Dormia basket group A and balloon extraction group B was evaluated. Data was analysed using SPSS 21.

Results: Of the 80 patients, 43(53.8%) were males and 37(46.3%) were females. The overall mean age was 55.7±14.2 years. Group A had 40(50%) patients; 21(52.2%) males and 19(47.5%) females with mean age 56.9±14.1 years. Group B had 40(50%) patients; 22(55%) males and 18(45%) females with mean age 54.6±14.5 years. (p>0.05). Change-over to the other method was done in 15(37.5%) patients of group A and in 8(20%) of group B (p=0.084). Mean time of the procedure was 57.4±21.7min in group A and 37.5±21.6min in group B (p≤0.001). Complications occurred in 3(7.5%) group A patients and 2(5.0%) group B patients (*p*=1.0).

Conclusion: Balloon extraction was found to be more successful than Dormia basket in the extraction of proximally migrated stent.

Keywords: Cholangiopancreatography, Endoscopic retrograde, Cholestasis, Stents, Cholangitis.

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Introduction

Endoscopic biliary stenting is the main line of management of malignant or benign biliary obstruction.[1,2] Biliary stenting is occasionally complicated by stent migration. In about 5% cases, proximal stent migration has been documented, and the causes of proximal stent migration have been reported mostly as malignant strictures, large-diameter stents and shorter stents.[3] Migrating stent may be complicated by biliary obstruction or infection, thus early management is necessary.[4] Not many studies have reported complications,[5] and the method to treat migration is influenced by various experiences regarding the use of a balloon, Dormia basket with or without assistance of foreign body forceps.[3,6-8] Retrieving migrated stents is usually possible endoscopically and rarely requires surgical intervention.[9, 10]

The current study was planned to evaluate the efficacy of Dormia basket and biliary balloon in the extraction of proximally migrated stent.

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Patients and Methods

The prospective study was conducted at Tanta University Hospital (TUH) and Kafrelsheikh University Hospital (KUH), Egypt, from December 2019 to December 2020. TUH is a tertiary facility that caters to patients from the Tanta governorate and surrounding areas, while KUH caters to patients from the Nile Delta region.

After approval from the KUH ethics review committee, the sample was raised from among patients attending the two hospitals for the management of proximally migrated stents. All patients were assessed through detailed history and physical examination. Those included were adults of both genders with biliary stenting following endoscopic retrograde cholangiopancreatography (ERCP) showing signs of biliary obstruction. Patients who had undergone ERCP without stent insertion were excluded. Written informed consent was taken from all the patients, and those who did not want to participate were excluded.

After laboratory evaluation and ultrasound examination, the treatment of choice was tried for a maximum of 50 minutes. Failure was considered the primary endpoint, and crossover to the other modality of treatment was done. If the extraction failed for another 30 minutes, this was considered the secondary endpoint, and another stent was inserted to bypass the migrated one.

The procedure was performed by skilled endoscopists who perform around 250 such procedures annually. All the cases were operated under anaesthesia. Standard ERCP with bile duct opacification was performed to assess the biliary tree, to identify migration if necessary, and to remove the migrated stents.

For the purpose of the study, stenting was defined as insertion of endoscopic biliary stent to obtain patent bile duct with good biliary drainage._Proximal migration meant shifting the biliary stent upward from its intended position so that its distal end may not be seen at the papilla._Diagnosis of stent migration was identified following full history-taking, abdominal X-ray, magnetic resonance cholangiopancreatography (MRCP) and by endoscopy (Figure 1). Stent extraction was considered successful when the stent was removed from the body. The migrating stent was removed using a side-viewing endoscope.

The difference in efficacy of and Dormia basket group A (Figure 2) and balloon extraction group B (Figure 3) was evaluated.

Data was analysed using SPSS 21. Qualitative variables were presented as frequencies and percentages, and Chi-square test was used for analysis. Numerical variables were expressed as mean ± standard deviation, and independent samples t-test was used for comparison of mean values between the groups. P≤0.05 was considered statistically significant.

Results

Of the 80 patients, 43(53.8%) were males and 37(46.3%) were females. The overall mean age was 55.7±14.2 years. Group A had 40(50%) patients; 21(52.2%) males and 19(47.5%) females with mean age 56.9±14.1 years. Group B had 40(50%) patients; 22(55%) males and 18(45%) females with mean age 54.6±14.5 years. (p>0.05). Overall, 71(88.8%) patients had stent length ≤10cm and 9(11.3%) had stent length >10cm (p=0.002). Duration of stent placement and stent diameter showed no significant difference between the groups (Table 1).

Change-over to the other method was done in 15(37.5%) patients of group A and in 8(20%) of group B (p=0.084). Foreign body assistance in 5(12.5%) group A patients and in 17(42.5%) group B patients (p=0.003). Another stent insertion was done in 7(17.5%) group A cases and in 3(7.5%) group B cases (p=0.176). Mean time of the procedure was 57.4±21.7min in group A and 37.5±21.6min in group B (p≤0.001). Complications occurred in 3(7.5%) group A patients and 2(5.0%) group B patients (p=1.0) (Table 2).

Table-1: Descriptive characteristics

	Dormia basket (group A) (n=40)	Balloon catheter (group B) (n=40)	Total (n=80)	P-value
Gender				
Male	21(52.5%)	22(55.0%)	43(53.8%)	0.823
Female	19(47.5%)	18(45.0%)	37(46.3%)	
Age (years.)	56.9± 14.1	54.6± 14.5	55.7± 14.2	0.480
Disease				
Benign	32(80.0%)	30(75.0%)	62(77.5%)	
Malignant	8(20.0%)	10(25.0%)	18(22.5%)	0.592
Type of sphincterotomy				
Complete	19(47.5%)	20(50.0%)	39(48.8%)	0.280
Incomplete	10(25.0%)	15(37.5%)	25(31.3%)	
Fistulotomy	6(15.0%)	4(10.0%)	10(12.5%)	
Percutaneous	5(12.5%)	1(2.5%)	6(7.5%)	
Sphincteroplasty	18(45.0%)	9(22.5%)	27(33.8%)	.033*
Duration of stent placement				
less than 1 month	2(5.0%)	0(0.0%)	2(2.5%)	
1>3 months	9(22.5%)	9(22.5%)	18(22.5%)	
3-6 months	12(30.0%)	12(30.0%)	24(30.0%)	
more than 6 months	17(42.5%)	19(47.5%)	36(45.0%)	.676
Stent diameter				
≤10 Fr	35(87.5%)	38(95.0%)	73(91.3%)	
> 10 Fr	5(12.5%)	2(5.0%)	7(8.8%)	.432
Stent length				
≤10 cm	40(100.0%)	31(77.5%)	71(88.8%)	
> 10 cm	0(0.0%)	9(22.5%)	9(11.3%)	.002*

*Significant

Table-2: Comparison of study outcomes in the study groups.

	Dormia basket (n=40)	Balloon catheter (n=40)	Total (n=40)	P-value
Shift to another method	15(37.5%)	8(20.0%)	23(28.8%)	.084
Need of foreign body assist	5(12.5%)	17(42.5%)	22(27.5%)	.003*
Insertion of another stent	7(17.5%)	3(7.5%)	10(12.5%)	.176
Time consumed(min)	57.4±21.7	37.5±21.6	47.4±23.8	.000*
Complications at 4 weeks follow up	3(7.5%)	2(5.0%)	5(6.3%)	1.000
Type of complications				
Bleeding	0(0.0%)	2(5.0%)	2(2.5%)	.243
Cholangitis	2(5.0%)	0(0.0%)	2(2.5%)	
Re-obstruction	1(2.5%)	0(0.0%)	1(1.3%)	
Time of complications				
Immediate	0(0.0%)	2(5.0%)	2(2.5%)	.243
Within 24 h	2(5.0%)	0(0.0%)	2(2.5%)	
After 24 h	1(2.5%)	0(0.0%)	1(1.3%)	

*Significant

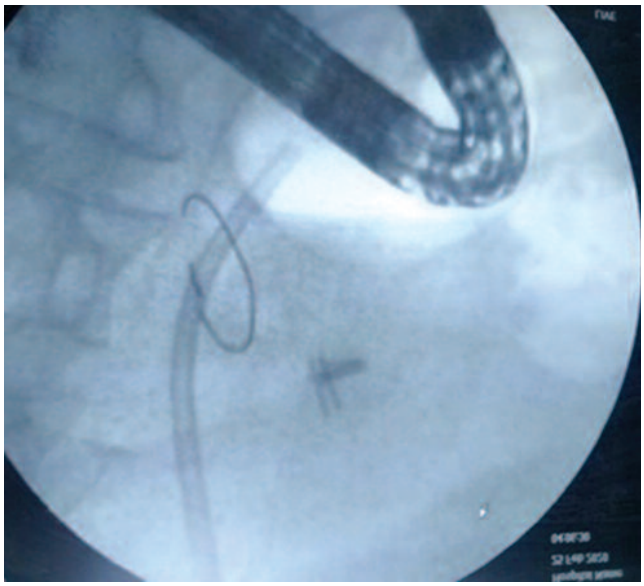

Figure 1: Proximally migrated biliary stent.

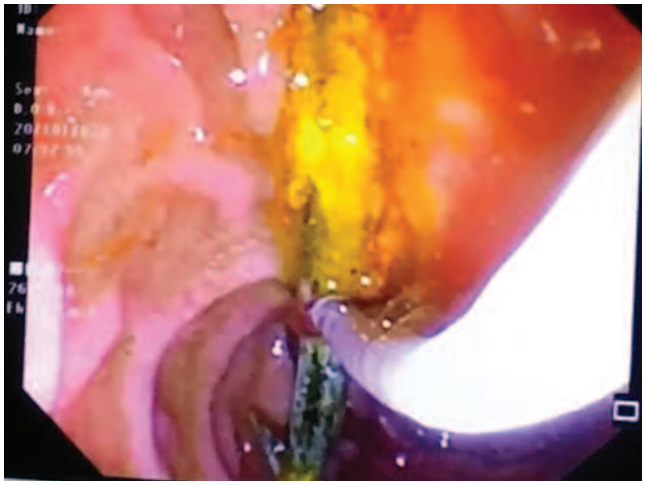

Figure 2: Dormia basket entrapping the proximally migrated stent.

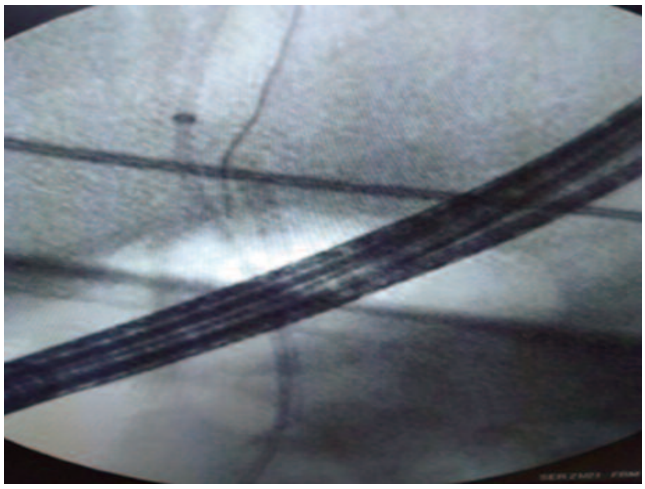

Figure 2: Dormia basket entrapping the proximally migrated stent.

Discussion

ERCP and biliary stenting is a common therapy of benign or malignant biliary obstruction[1,2]. Biliary stenting is associated with complications in up to 10% cases[11]. Proximal migration is one of the common complications due to biliary tract dilatation that leaves the stent floating inside the duct.[12]

Several approaches were used for managing biliary stent migration as balloon or Dormia basket extraction with or without the assistance of foreign body forceps.[3,6-8]

The current study showed no difference between the balloon extraction and Dormia basket groups regarding gender, type of disease (benign or malignant), and stent diameter.

Studies have concluded that a shorter stent has higher chance of migration,[3, 7.,11] and the current study endorsed the finding. In the current study, only 33.8% patients underwent sphincteroplasty, which is in line with literature.[3]

The current study found that 37.5% of patients in the Dormia basket groups had to be shifted to balloon extraction compared to only 20% of the balloon extraction group who needed to be shifted to Dormia basket. This was in contrast to a study which reported that the many wires of the Dormia basket increased the likelihood of engaging the stent than the balloon.[11]

The current study showed that sphincterotomy was non-significantly different between the groups, which is not consistent with Kawaguchi et al.[3]

The current study found no significant difference between migrating stent with respect to diameter, but contrasting results have been reported earlier.[3]

Balloon extraction was found to be more successful more than Dormia basket in the current study. Chaurasia et al. limited this success to non-dilated or mildly dilated bile ducts.[11]

The need of foreign body assistance was more with balloon than with Dormia basket in the current study and this is in agreement with an earlier study.[11]

The rate of complication in the current study did not exceed 6.3%, and most of them occurred in the first 24 hours. A previous study did not report any complications during stent extraction.[11]

Conclusion

Balloon extraction was more successful than Dormia basket in the extraction of proximally migrated stents. Rate of

complications had no significant difference between the two techniques.

Limitations: The current study has limitations as it did not calculate the sample size, and the number of patients included was relatively low. A large-scale, multicentre study is recommended to validate the current findings.

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