

# Are Double-Layer Stents Better than Plastic Stents and Self-Expandable Metal Stents in Palliating Malignant Biliary Obstruction? Meta-Analysis and Systematic Review

Harsha Moole<sup>1\*</sup>, Matthew L. Bechtold<sup>2</sup>, Micheal Cashman<sup>3</sup>, Fritz H Volmar<sup>3</sup>, Sonu Dhillon<sup>3</sup>, David Forcione<sup>4</sup> and Srinivas R Puli<sup>3</sup>

<sup>1</sup>*Division of General Internal Medicine, University of Illinois College of Medicine at Peoria, Illinois, USA*

<sup>2</sup>*Division of Gastroenterology and Hepatology, University of Missouri, Columbia, Missouri, USA*

<sup>3</sup>*Division of Gastroenterology and Hepatology, University of Illinois College of Medicine at Peoria, Peoria, Illinois, USA*

<sup>4</sup>*Interventional Endoscopy Services, Gastrointestinal Unit, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts, USA*

\***Corresponding author:** Harsha Moole, MD, Department of Internal Medicine, University of Illinois College of Medicine Peoria, 530 NE Glen Oak Ave, Peoria, Illinois, 61637, USA, Tel: +1 (309) 655-2730; Fax: 001 (309) 655-2755; E-mail: [harshal778@yahoo.co.in](mailto:harshal778@yahoo.co.in)

**Received date:** June 18, 2016, **Accepted date:** July 27, 2016, **Published date:** August 3, 2016

**Copyright:** © 2016 Moole H, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract

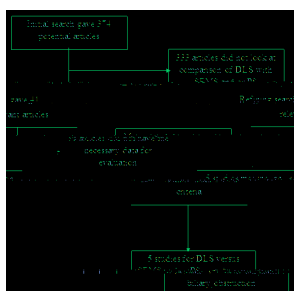
### Background:

properties. These properties would minimize the accumulation of bile or sludge on the inner surface of stent, thereby delaying the stent occlusion. DLS has four flaps each on duodenal and distal ends to

## Results

Initial search identified 374 reference articles, of which 41 articles were selected and reviewed. Data was extracted from five studies [7,19-22] (N=460) for DLS compared with SEMS and/or PS which met the inclusion criteria.

All the studies are published as full text articles. Figure 1 shows the search results. All the pooled estimates given are estimates calculated by the fixed and random effect models.



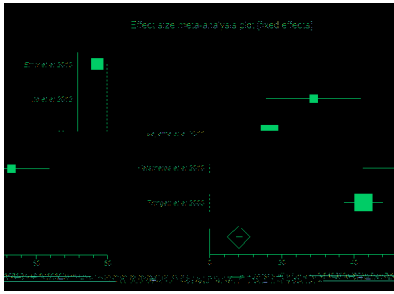
**Figure 1:** Flow chart with search results and selection criterion.

No	Study	Type of study
1	Elwir et al. [7]	
2	Ito et al. [19]	
	Itoyama et al. [20]	

Figure 2 shows the baseline characteristics of the patients included in this study, three [20] were treated with PS and two [7,19] are retrograde intubation. Pooled estimates by fixed and random effect models are similar.

The pooled estimates showed heterogeneity in the pooled estimates. This article looked at the pooled estimates for survival rates, cholelithiasis, and cholecystitis.

However, most of the studies did not report on the variables studied in this meta-analysis. The pooled estimates for information regarding the variables in the pooled effect sizes for each variable.





32. Sterne JAC, Egger M (2001) Funnel plots for detecting bias in meta-analysis: guidelines on choice of axis. *Journal of Clinical Epidemiology* 54: 1046-1055
33. Katsinelos P, Paikos D, Kountouras J, Chatzimavroudis G, Paroutoglou G, et al. (2006) Tannenbaum and metal stents in the palliative treatment of malignant distal bile duct obstruction: a comparative study of patency and cost effectiveness. *Surg Endosc* 20: 1587-1593
34. Liberato MJ, Canena JM (2012) Endoscopic stenting for hilar cholangiocarcinoma: efficacy of unilateral and bilateral placement of plastic and metal stents in a retrospective review of 480 patients. *BMC Gastroenterol* 12: 103
35. Donelli G, Guaglianone E, Di Rosa R, Fiocca F, Basoli A, et al. (2007) Plastic biliary stent occlusion: factors involved and possible preventive approaches. *Clin Med Res* 5: 53-60
36. Jagannathan S, Lee JH (2012) Self-expandable metal stents in malignant biliary obstruction. *Am J Surg* 204: 101-107