Non-Vascular Self Expandable Stents – Liver, Gall Bladder & Bile Ducts

CSIR-NCL in collaboration with a start-up has developed a new class of self-expandable stents based on a novel scroll design.Using this design, stents could be made at a much lower cost as compared to the currently available ones.

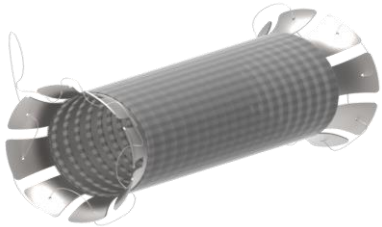
Stents are used in the treatment of numerous biliary tract diseases, ranging from benign biliary diseases to malignant structures.The biliary tract or biliary system refers to the liver, gall bladder and bile ducts, and how they work together to make, store and secrete bile. Two types of biliary stents find extensive use: plastic stents and self-expanding metallic stents. Amongst these the self-expandable metal stents offer longer patency while their prohibitive cost makes them less affordable.

On the other hand plastic stents get clogged very often causing great inconvenience to the patient. Dr. B. L. V. Prasad's and his group collaboratedto develop self-expandable stents based on a novel scroll design. These stents have been made with simple polymer-metal composites unlike the shape memory alloy based stents. The novel design allows these stents to meet the characteristics of shape memory alloy based stents and could be made at a much lower cost.

	Polymeric non - expandable	Metal-self expandable	Composite Self - Expandable CSIR-NCL
ERCP imposes geometrical constraints			
Material | Process	Polyethylene | extrusion	Nitinol | laser machining	Polymer -metal composite | hot - press
Cost	700 – 5000 INR	50,000 – 1,20,000 INR	1000 – 5000 INR
Characteristics	**Economical Removable Clogging (short patency) Non -expandable**	**Not affordable Non -removable Longer patency Self -expandable**	**Economical Removable Longer patency Self -expandable**

Salient features

The currently available self-expandable metal stents are priced in the range of 1100 – 2600 USD. These stents are made of shape memory alloys such as nitinol which is a major component of cost. In addition, these stents are fabricated using expensive techniques such as precision cutting using lasers, followed by electro-polishing.



Design of the Prototype Stent

CSIR-NCL's stent designs are based on radically different approach where expensive materials and expensive processes to manufacture them are not required. Thus the stents being developed are expected to be available at lower costs and they still possess the characteristics of self-expanding stents.

An estimated 3.5 Lakh stenting procedures (Esophageal alone) are expected to have been performed in India (Source: World cancer research fund international). Even if it is assumed that 60% of these are performed on people with low and medium income levels -the stents made available by CSIR- NCL's work could make huge societal impact. To transfer the technology CSIR-NCL has signed a research collaboration agreement and signed an MoU with Embryyo Technologies Pvt. Ltd.(Embryyo), Pune.

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