

# Comparing the Safety & Efficacy of Savary-Gilliard and Balloon Dilatators in Corrosive Esophageal Strictures

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## ABSTRACT

**Background:** Corrosive intake and subsequent esophageal stricture formation is a major health hazard in developing countries. The main stay of treatment for dysphagia resulting from corrosive intake is endoscopic dilatation of stricture. Two methods of dilatation are currently in wide use, push type dilators (Savary-Gilliard) and balloon dilators.

**Aim:** To compare the safety & efficacy of Savary-Gilliard and Balloon dilatators in corrosive esophageal strictures.

**Methods:** The study cohort included 60 patients who presented to our Department of Gastroenterology with dysphagia due to corrosive esophageal strictures between February 2016 to September 2017. During the procedure, half the patients were dilated with balloon dilatators and half with Savary-Guilliard dilators. All the dilatations were performed by experienced endoscopists.

**Results:** A total of 159 dilatations were performed in 60 patients. 72 dilatations were performed with Savary-Gilliard dilators in 30 patients and 87 dilatations with balloon dilators in other 30 patients. Treatment success was obtained in 28/30 patients (93.3%) in Savary-Gilliard group and 27/30 patients (90%) in balloon dilator group. Treatment failure was noted in 5 patients, two in Savary-Gilliard group and three in balloon dilator group. No perforation was seen in Savary-Gilliard group while one perforation occurred in balloon dilator group. **Conclusion:** Both methods of stricture dilatation were safe and effective, although Savary-Gilliard dilators were slightly more effective and safer.

**Keywords:** Corrosive esophageal strictures, Balloon dilatators, Savary-Guilliard dilators, Outcome

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## INTRODUCTION

An esophageal stricture is a narrowing in the lumen of the esophagus that causes difficulty in swallowing, a frequently faced problem by gastroenterologists. These strictures are of two types, benign or malignant<sup>1</sup>. Benign esophageal strictures include corrosive strictures, peptic strictures, esophageal rings & web, radiation induced strictures and anastomotic strictures. Malignant esophageal strictures are caused by primary esophageal cancer or extra esophageal malignancies involving the esophagus. Corrosive strictures are caused by accidental or suicidal intake of acids or alkalis. The acids inflict more injury in the stomach compared to alkalis, which induce more damage in the esophagus. Esophageal stricture can be diagnosed with barium swallow but gold standard is upper GI endoscopy. However, to assess the nature of the stricture, endoscopic biopsy of the lesion is sometime mandatory. Dilatation of an esophageal stricture is a therapeutic procedure that results in resolution of dysphagic symptoms experienced by the patient. Commonly used dilators are of two types, balloon type dilators and push type dilators like Savary-Guilliard dilators<sup>2</sup>. The rule of three is a commonly used scheme that reduces the risk of perforation while using these dilators. According to this rule, in a single session, only three dilators of progressively increasing diameter should be passed. Some gastroenterologists recommend the use of fluoroscopy for positioning of guide wire while using push type dilators. However, some authors believe that fluoroscopy is not necessary for this procedure<sup>3</sup>. Similar

studies have been conducted in Ibn Sina Hospital, Morocco<sup>4</sup> and Santa Casa University Hospital of the Brazil<sup>5</sup>. The aim of our study was to compare the safety & efficacy of Savary- Gilliard dilators and balloon dilators in the management of corrosive esophageal strictures

## MATERIAL AND METHODS

From February 2016 to September 2017, a total of 60 patients underwent endoscopic dilatation of corrosive esophageal stricture in our Department Gastroenterology, DHQ Hospital Gujranwala. Patients were divided into two groups (30 patients in each group). In one group we used Savary- Gilliard dilators and in the other group balloon dilators were used. After taking approval from institutional review board (IRB), patients fulfilling the inclusions and exclusion criteria were explained about the study and its outcome. Informed consent obtained from all the patients and their demographic data, history and clinical examination was recorded.

**Instruments & Technique:** All the strictures were assessed using barium studies and endoscopic examination using Olympus-190 endoscopes. 25 patients underwent endoscopic dilatation using balloon dilators, while in other 25 patients the dilatations were performed using Savary-Guilliard dilators passed over previously placed guide wire, without using the fluoroscope. The rule of three was used while dilating the strictures and maximum dilation was performed up to 15 mm. In cases where the dysphagia or stricture recurred during the follow-up, additional dilatation was performed until the dysphagia resolved. All the procedures were carried out under propofol sedation. Barium swallow was performed in all

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patients before dilatation. After the procedure, patients were observed for a period of about four hours and in case of persistent chest pain, an X-ray chest with water soluble contrast was obtained to check for perforation. Post procedure medical treatment (Proton Pump Inhibitor and Sucralfate) was given to all the patients undergoing dilatation. All patients underwent repeat endoscopy within 2 weeks following the initial dilatation and the procedure was repeated based on patient's symptom of dysphagia or endoscopic appearance of residual stricture. After that, evaluation was performed every 8 weeks for 6 months. Treatment success was defined by the ability of patients to tolerate a solid diet for more 6 months without the need of repeated dilations.

**RESULTS**

In Savary-Gilliard group 12 patients were male and 18 patients were female while in balloon dilator group 08 patients were male and 22 patients were female. Age range in Savary-Gilliard group was 18-45 (mean 35 yr) while in balloon dilator group was 16-40 (mean 32 yr). In 60 patients with corrosive strictures, 159 dilations were performed over a period of twenty months. In Savary-Gilliard group 72 dilatations were performed (2.8 per patient) and in balloon dilator group 87 dilatations were performed (3.4 per patient). Treatment success of Savary-Gilliard group was 93.3% (28/30 cases) and that of balloon dilator group was 90% (27/30 cases). The Savary-Gilliard group had a slightly better result than the balloon dilator group. In our study, only one perforation was encountered and it was with balloon dilator, that was managed conservatively. The number of sessions per patient were 1-5 in Savary-Gilliard group and 2-5 in balloon dilator group. Failure of endoscopic dilatation (defined by failure to dilate up to 15mm diameter or recurrence of stricture after 10 sessions of dilatation) was noted in 2 patients with Savary-Gilliard dilators and in 3 patients with balloon dilators. These patients were referred for surgery.

Clinical data of patients undergoing dilatation

	Savary Guilliard	Balloon Dilators
Patients in each group	30	30
Dilatations in each group	72	87
Mean Age (Range) year	35(18-45)	32(16-40)
Male to Female Ratio	12:18	08:22
<b>Stricture location</b>		
Upper	2	3
Middle	10	6
lower	18	21
Mean diameter of stricture (range) mm	5 (2-7)	4 (3-6)
Mean Length of Stricture (range) mm	20(10-60)	22 (5-50)

Outcome of Stricture dilatation

	Savary Guilliard	Balloon Dilators
Patients in each group	30	30
Mean No. of Dilatations (range)	2.8 (1-4)	3.4(2-5)
Success Rate (%)	93.3%	90%
Failure Rate (%)	2	3
Perforation	0	1

**DISCUSSION**

The most common cause of corrosive esophageal strictures is suicidal or homicidal intake of alkali or acid. Gold standard test for assessing the mucosal injury is upper GI endoscopy.<sup>6</sup> Endoscopic dilatation is the mainstay of its treatment. The most commonly used dilators in endoscopic dilatation are push type dilators and the balloon dilators. Push type dilators are mercury or tungsten filled bougies or wire guided (Savary-Guilliard). In a study conducted in 2015, the effect of push type dilators was assessed in 71 childrens and rate of success was 94.37 %.<sup>7</sup> While the safety of balloon dilators in endoscopic dilatation of corrosive strictures was demonstrated by Cakmak M et al.<sup>8</sup> In a meta-analysis conducted in 2017, both methods of dilatation were found safe and equally effective in term of symptomatic relief, recurrence, bleeding, and perforation<sup>9</sup>. Complex strictures have high recurrence rates and are considered to be refractory if can't be dilated to adequate diameter, re-occur in a short interval of time or require repeated dilations, usually > ten sessions. Different agents have been tried to decrease the rate of recurrence in corrosive esophageal strictures such as Triamcinolone injection and Mitomycin C injection with variable results<sup>10,11</sup>. The Placement of fully covered metallic stent and incision therapy are recent advances in treatment for refractory stricture.<sup>11, 12</sup> Factors affecting the success of dilatation are diameter of stricture, its length and number of sessions required to dilate it.<sup>13</sup> The most common complication seen with endoscopic esophageal dilatation is perforation (0.5-1.2%). Other complications are hemorrhage and bacteremia.<sup>14</sup> The risk of perforation and bleeding is more with complex strictures compared with simple strictures.

**CONCLUSION**

Our study suggests that dilatation of corrosive esophageal strictures with both Savary-Guilliard dilators and balloon dilators is safe and effective. Both methods of dilatation are safe and effective. However, Savary-Gilliard dilators are found to be slightly more effective and safe.

**Conflicts of interest:** There were no conflicts of interest.

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