Improvized pneumatic dilator for achalasia cardia

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The indigenous pneumatic dilator for achalasia cardia reported previously by the authors was being placed alongside the endoscope to perform dilatation under direct vision. It has now been improvised to make the procedure wire-guided and fluoroscopy-assisted as well. The improvisation includes insertion of a central Teflon tube for passage of a guidewire and presence of three radio-opaque markers, which define the proximal, central and distal ends of the dilator and help in precise positioning under fluoroscopy. Dilatation for achalasia cardia using the improvised pneumatic dilator with fluoroscopic guidance was performed successfully on 10 patients at our center. All patients had clinical response with greater than 50% improvement in total symptom score. Barium swallow examination after dilatation showed improvement in esophageal transit in all patients. None of the patients developed any complication. Cost of the dilator is approximately 50 times less than that of commercially available dilators. The dilator can be re-used by sterilizing it, which further reduces the cost. [Indian J Gastroenterol 2003;22:143-144]

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We have experience with using our own indigenous pneumatic dilator for achalasia cardia for the last 7 years. The dilator is placed alongside the endoscope and its position at the gastroesophageal junction is confirmed by the retroverted view of the fundus of the stomach. There is however fear regarding damage to the endoscope while applying a pneumatic pressure of 300 mmHg at the gastroesophageal junction while keeping the endoscope by the side of the dilator. We therefore improvised the pneumatic dilator to make the procedure wire-guided and fluoroscopy-assisted.

Technique

Method of preparation (Fig)

An 18G Ryle’s tube (A) is taken, its terminal metal beads are removed, and a central hole of 2.5 mm size is made. A three-way adaptor (E) is attached to the other end of the Ryle’s tube. A silicon valve (K) is placed in the three-way adaptor and a Teflon tube (B), 115 cm in length with outer diameter of 2.5 mm and inner diameter of 1 mm, is passed through it and along the whole length of the Ryle’s tube till it comes out of the terminal central hole. The lumen of the Ryle’s tube around the inner Teflon tube is plugged airtight proximal to the most distal hole with the help of a silicon valve (C) and adhesive. Thus, the single-lumen Ryle’s tube is converted to a double-lumen tube allowing passage of a guidewire through the inner tube.

Flexible, braided, stainless steel, plastic-coated radio-opaque wires (D) 0.75 mm thick are fixed over the Ryle’s tube at three places, i.e., at 3 cm (proximal to the distal opening), at 12 cm and at 21 cm (proximal to the most proximal opening) from the distal end. These mark the distal, central and proximal ends of the dilator. The marks are covered with pieces of latex tube. A condom (I) is fixed over the Ryle’s tube at the distal and proximal markings described above. The extra portion of the condom is removed. A dumbbell-shaped silk cloth (H), 18 cm in length with a central black ring (J) and maximum diameter of 3.5 cm at the center, is then sewed over the tied condom and the proximal and distal ends tied on the tied ends of the condom and then covered with pieces of latex tubing.

An inflator bulb (G) with manometer and another three-way (F) are attached to the proximal end of the assembly prior to dilatation. Two three-way stopcocks are needed in the assembly. The Teflon tube with the
guidewire passes through the three-way (E), which therefore becomes fixed and cannot be rotated for connecting and disconnecting the inflator bulb and manometer. Another three-way (F) is therefore required to operate the inflator bulb with manometer.

The pneumatic dilator withstands maximum pressure of 300 mmHg. It can be sterilized by washing with cetrimide or soap and running water, followed by immersion in 2% glutaraldehyde. The dilator can be sterilized and re-used multiple times, till such time that it is damaged or punctured. The cost of preparation of each pneumatic dilator is Rs. 500.

Procedure

After overnight fast, the patient is subjected to endoscopy and esophageal and gastric secretions are sucked out. We administer diazepam (10 mg) and pentazocin (30 mg) intravenously prior to the procedure. A metal spring-tipped guidewire is passed into the stomach and the endoscope is withdrawn. The position of the wire is confirmed on fluoroscopy. The pneumatic dilator is lubricated and passed over the guidewire. Its central marker is positioned at the level of the diaphragm. The dilator is then inflated to a pressure of 300 mmHg for 2 minutes. The dilator and wire are then taken out and the endoscope is re-introduced to check for mucosal injury. We keep our patients nil by mouth and on intravenous fluids after dilatation and monitor them for 24 hours for complications.

We used this improvised pneumatic dilator successfully in 10 patients (mean age 35 years, range 20 to 47 years; 6 men) with achalasia cardia at our center. Symptoms were evaluated as the sum of scores for dysphagia, regurgitation, and chest pain. The frequency of each symptom was graded as 0 = none, 1 = once per month or less, 2 = once per week, 3 = two to four times per month, 4 = two to three times per week, 5 = once per day, and 6 = several times per day. The maximum total score was 15 points for each patient. Patients were interviewed initially and at six weeks after dilatation. Clinical response was defined as greater than 50% improvement in the total symptom score.

All patients had greater than 50% improvement in the total symptom score. Median scores were 11 prior to dilatation and 4 after dilatation. Repeat barium swallow examination 5 to 6 weeks after dilatation showed improvement in esophageal transit in all patients, though an objective timed-barium esophagogram was not performed. None of the patients developed any complication.

Discussion

The indigenous pneumatic dilator we describe has been successfully used in an earlier version with endoscopic guidance in which the central black ring on the silk cloth is helpful in precise positioning of the dilator at the gastroesophageal junction. The present improvisation includes: (a) the insertion of a central Teflon tube for passage of a guidewire, and (b) the presence of three radio-opaque markers, which define the proximal, central, and distal ends of the dilator and help in precise positioning under fluoroscopy. The dilator thus has the advantage of use by both endoscopic and fluoroscopic methods.

The cost of this dilator is approximately Rs. 500, as compared to approximately Rs. 23,000 for a Rigiflex balloon dilator (Microvasive, Millford, Mass., USA). The dilator can be re-used by sterilizing it, which further reduces the cost. This is an important issue in management of achalasia cardia in India where health-care resources are limited.

References


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