The purpose of this guideline is to provide an updated, practical strategy for the use of esophageal dilation. Esophageal dilation is performed for treatment of symptomatic anatomical or functional narrowing of the esophagus, caused by a variety of benign and malignant conditions (1,2). Patients with symptomatic peptic, neoplastic, corrosive, radiation, post-surgical and sclerotherapy-induced strictures, as well as rings, webs and achalasia frequently require dilation. Empiric bougienage may also benefit patients with dysphagia to only solids, in whom esophagoscopy is normal (3). Dilation generally does not improve dysphagia caused by extrinsic esophageal compression. Initial dilation should not be performed until the esophagus and accessible upper gastrointestinal tract have been evaluated with contrast radiography and/or endoscopy, with biopsy and brushing as indicated (2). Repeat endoscopy, biopsy and brushing may be necessary after a stricture has been dilated, to assure complete evaluation of the stricture and upper gastrointestinal tract. Esophageal dilation should be considered only one aspect of management of the underlying disease.

**CONTRAINDICATIONS**

Acute or incompletely healed esophageal perforation is an absolute contraindication to esophageal dilation. Relative contraindications include bleeding disorders, severe pulmonary disease, recent myocardial infarction, recent esophageal perforation or surgery, pharyngeal or cervical deformity, recent laparotomy, and large thoracic aortic aneurysm. Concomitant radiation therapy is not a contraindication to esophageal dilation (4). If endoscopy is being performed as part of the dilation procedure, the usual list of absolute and relative contraindications applies. Pinch biopsies of the esophagus do not preclude dilation during the same procedure (see below-Technique).

**EQUIPMENT**

Available dilation equipment includes mercury or tungsten- filled rubber bougies (blunt and tapered-tip dilators), fixed-size dilators (wire-guided metal olives, wire-guided tapered polyvinyl bougies and Celestin-type dilators) and balloons (directed endoscopically or wire-guided). There are few published data which aid in choosing one dilation method over another. Studies comparing the efficacy of bougies and endoscopically-directed balloons for the dilation of benign peptic strictures have yielded conflicting results (5-7). Weighted bougies can be used for the dilation of many peptic strictures. Controversy remains as to whether fluoroscopic guidance is routinely necessary when performing Maloney dilation. The use of fluoroscopy appears to enhance dilation efficacy (8-10). Weighted bougies smaller than 30 Fr tend to be too flexible to traverse and dilate most high-grade strictures. Wire or endoscopically-guided methods are usually necessary when dilating long, narrow-caliber and/or tortuous strictures, or those associated with surgically altered anatomy, esophageal diverticula or large hiatal hernias. Fluoroscopic monitoring is frequently useful in these situations, but may be unnecessary where the anatomy is straight, well-defined, and/or an endoscope can traverse the stricture. Routine fluoroscopy was previously recommended with the use of wire-guided dilators. Tapered polyvinyl bougies with the use of a marked guidewire have recently been shown to provide a safe method for dilation, without the necessity for routine fluoroscopic monitoring (11,12).

**TECHNIQUE**

Prior to dilation, the patient should have an empty esophagus and stomach. Topical pharyngeal anesthesia is often used. Sedation may be helpful under some circumstances, especially when dilation involves the use of guidewires and/or endoscopy. To achieve an adequate lumen by dilation, several sessions may be required. It is recommended that once moderate resistance is encountered, no more than three (3) dilators of progressively increasing diameter (a total of 3 mm) be passed in a single session (1,13). It has recently been suggested that endoscopic monitoring of mucosal damage during the
dilation session may be a more objective and appropriate measure for dilation endpoint (14). Resistance is more difficult to judge when using balloon dilators. Filling hydrostatic balloons with a 1:3 dilution of water soluble contrast may be useful to facilitate fluoroscopic monitoring. It is frequent practice and appears safe to perform dilation immediately after mucosal biopsy of the esophagus (15).

RESULTS

Dilation results in improvement or resolution of dysphagia in the majority of patients with benign strictures (16). If a luminal diameter of at least 39 to 45 Fr can be achieved, nearly all patients will be relieved of dysphagia. Several recent series of patients with predominantly peptic esophageal strictures substantiate that progressive dilation to between 40 and 60 Fr resulted in good relief of dysphagia in 85-93% of patients (17-20). In contrast to benign strictures, rings or webs are treated by disruption through passage of a single large-caliber dilator, which usually achieves adequate results. If a lower esophageal ring cannot be distinguished from a short peptic stricture, graded stepwise dilation is appropriate. Most malignant strictures respond to dilation, but relief from dysphagia is usually transient. Dilation of a malignant stricture is often necessary preceding laser or other ablative endoscopic procedures and prior to placement of an endoprosthesis. After successful dilation of both benign and malignant strictures, dysphagia may recur, necessitating retreatment at variable intervals (19). Carefully selected, highly motivated patients with chronic benign strictures can be taught periodic self-dilation (21).

COMPLICATIONS

The principal complications of dilation include perforation, pulmonary aspiration and bleeding. Transient chest pain is frequent during dilation of high-grade or neoplastic strictures. Persistent pain or the evolution of fever warrant evaluation to exclude a complication. In an ASGE survey, both perforation and bleeding occurred at a rate of approximately 0.3% per procedure (22). The risk is higher when dilating complex strictures (longer, narrower, more angulated), particularly those caused by lye ingestion. Bacteremia may occur after esophageal dilation, however the need for routine dilator sterilization prior to the procedure remains controversial. The role of prophylactic antibiotics prior to esophageal dilation has been reviewed elsewhere (23).

ACHALASIA

Esophageal dilation for achalasia is unique in that it involves forceful disruption of the lower esophageal sphincter (24). It is critical that an accurate diagnosis be made prior to dilation. Esophageal manometry remains an important diagnostic test. Although a typical barium radiographic appearance may be present, an endoscopic exam should be performed since neoplasms of the esophagogastric junction can mimic idiopathic achalasia on clinical, radiographic and manometric bases (25). CT scanning and endosonography of the esophagogastric junction may be useful when a neoplasm is strongly suspected and other modalities fail to confirm the diagnosis.

Although other treatments have been proposed, sustained relief of symptoms usually requires disruption of the lower esophageal sphincter on a physical (e.g. with specialized dilators or surgery) or physiologic (e.g. with intrasphincteric botulinum toxin injection) basis (26). The role of botulinum toxin injection in the treatment of achalasia will not be discussed given the scope of this guideline.

Several types of dilators can be used for treating achalasia. A detailed description of these instruments is beyond the scope of this guideline. The choice of dilator and technique should be based on training and experience, as there are few comparative studies available. Two studies have suggested that comparable clinical results can be attained utilizing different dilator systems (27,28). Preliminary results from a prospective, controlled study suggest that when utilizing the widely available wire-guided polyethylene pneumatic dilator system, comparable results can be obtained using a 30mm balloon inflated for 15 s (@10psi) as are attained with a larger balloon and longer balloon inflation durations (29).

The usual precautions related to esophageal dilation apply to forceful dilation of the LES in achalasia. Dilation in a tortuous esophagus can be safely performed if a guidewire technique is utilized. Despite an overnight fast, a dilated esophagus may retain fluid and debris, requiring evacuation prior to dilation. Administration of a sedative and/or an analgesic is important as the procedure frequently induces pain. Fluoroscopic or endoscopic guidance for placement of the dilator is mandatory. Following the procedure, an esophagram is often obtained to exclude perforation, however its routine use remains controversial. Patients should be closely observed for several hours after the procedure. Hospitalization for observation is appropriate in selected patients, however a recent study suggests that the procedure may be safely performed on an outpatient basis under certain circumstances (30). Clinical success is ultimately reflected by improvement in dysphagia, regurgitation and weight gain.

Greater than 60% of patients will have good long-term results after pneumatic dilation. The risk of
perforation after forceful dilation in achalasia is reported to be 1-4%, with a mortality rate of less than 1%. Post-dilation reflux may occur, but is usually mild and readily responsive to medical therapy. If a single dilation session does not produce satisfactory symptom relief, a second or third attempt may be warranted. If this fails, surgery is usually indicated. Surgical myotomy generally provides a 10-20% higher rate of long-term relief of dysphagia, but is attended by higher risks of operative mortality and significant gastroesophageal reflux (26, 31-35). Comparative trials involving the use of laparoscopic myotomy are unavailable.

REFERENCES