

Use of Abdominal Palpation Instead of Image Intensifier to Confirm Correct Positioning of Guide Wire in Esophageal Dilatation Using Savory Gilliard Dilators

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ABSTRACT

Esophageal dilatation using Savory Gilliard dilator system is performed by passing serial dilators over a guide wire. Correct placement of guide wire is usually confirmed by screening using an image intensifier before dilatation is performed. We use abdominal palpation instead of image intensifier to check position of the guide wire. Our technique and results of 531 esophageal dilatations attempted in our unit from January 2008 to May 2010 are presented. In 508 cases (95.7 %), position of the guide wire could confidently be confirmed to be in the stomach by palpation. In these cases dilatation was performed. 18 patients (3.5% of all the dilatations done) sustained an esophageal tear. Eleven patients had minor and confined leak. These patients were managed conservatively and survived. Seven patients had a major leak. Out of them three died (0.59% overall procedure related mortality). In 17 patients who sustained an esophageal tear, evidence suggests that position of guide wire was correct and esophageal perforation occurred because of error of judgment in selecting size of the dilator. We therefore conclude that abdominal palpation is a safe, practical and efficient method to confirm correct position of the guide wire before dilatation. With careful application of this technique, only in a very small fraction of the patients image intensifier is needed. This will help in more efficient use of resources and will save the patient from unnecessary radiation exposure.

Key words: Guide wire, esophageal dilatation, abdominal palpation, image intensifier

INTRODUCTION

Esophageal dilatation is a common procedure performed by endoscopists, gastroenterologists and surgeons involved in esophageal work. Although many different techniques of esophageal dilatation are practiced^{4,10}, some variation of using dilator over a properly placed guide wire is generally considered to be the safest^{4,5,6,13}. Correct placement of guide wire through esophagus across the stricture and into stomach is confirmed radiologically^{4,6,10}, usually by an image intensifier. We, however, in our unit rely on digital palpation of guide wire in the stomach to confirm correct placement of the wire before dilatation is performed using Savory Gilliard Dilator System (Wilson-Cook Medical GI Endoscopy; Winston-Salem USA).

MATERIAL AND METHODS

We analyzed records of all esophageal dilatations attempted in our unit and at practice of one of the authors [IHK] during the period between January

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2008 to May 2010. Most dilatation (practically all in children under 12 years of age) were done under general anesthesia (G/A) using rigid esophagoscope and Savory Gilliard (over the guide wire) dilator system. Some were done under local anesthesia (L/A)+sedation using flexible gastroscope. Necessary information was gathered by reviewing the case notes, hospital records, unit's data base and by contacting the patients, in person or by telephone, whenever necessary. Data was analyzed by using Microsoft Access 2007 software.

Technique: Flexible or rigid scope is passed under suitable anesthesia and stricture is visualized. A standard 0.0038 inches diameter steel guide wire with flexible spring tip is introduced under direct vision through the stricture. Care is taken not to apply too much force although some times wire need to be re-passed or jiggled if it does not go down smoothly. Once it is assumed that the guide wire has been negotiated across the stricture and into the stomach, its presence in the stomach is confirmed by palpating the upper abdomen while jiggling the guide wire. A wire in the stomach is typically felt in the left upper abdomen going towards the right side when it takes its course along the greater curve of the stomach. With the patient fully relaxed under G/A (especially in

children who have very thin abdominal wall), feeling of the guide wire is unmistakable. In patients where dilatation is being done under L/A, the guide wire can be felt in the upper abdomen when patient is turned on to his back. Patient too can confidently tell that he can feel the wire flipping in his stomach. When the operator is satisfied about position of the guide wire, dilatation is performed by passing dilators serially over the wire. In the rare event of wire not being felt in the abdomen, the procedure is repeated under image intensifier or a plain per-operative radiograph of lower chest and upper abdomen is obtained. Post operatively, patients are observed in the ward for 6-8 hours. Once the patient is fully recovered from G/A, a check list (table -1) is completed by our junior medical staff before discharging the patient. If any of first six points in the list is not satisfactory, the patient is labeled as "suspected to have iatrogenic esophageal perforation". Such patient is retained in the hospital, kept nil by mouth, intravenous (I.V) fluids are continued, antibiotics started, a plain chest X-Ray obtained and the consultant is informed. If the consultant agrees with the suspicion, a barium swallow is obtained and the patient is managed accordingly.

RESULTS

During 29 months of study period (January 2008-May 2010) a total of 531 dilatations were attempted. In 8 cases (1.5 %), guide wire could not be passed. In 15 cases (2.8 %), guide wire did go down but could not confidently be palpated in the abdomen therefore, procedure was abandoned in these cases. In remaining 508 cases (95.7 %), correct position of guide wire could be confirmed by abdominal palpation and dilatation was carried out (Table 2). Out of the total of 508 dilatations performed, 71(14 %) were performed under L/A±sedation using flexible gastroscope, while 437(86%) were performed under G/A using rigid scope. All dilatation in children under 12 years of age were performed under G/A. Age, sex and aetiological distribution of patients is given table 3. These 508 procedures were performed on a total of 119 patients. 63(53%) patients had more than one dilatation during the study period (average: 7.2 dilatations per patient; Range: 2-14 dilatations). No perforation occurred in procedures done under local anesthesia. During post-operative observation period, 68 patients were suspected to have esophageal perforation by junior medical staff according to the protocol. Consultant agreed with the diagnosis in 23 cases. Barium study confirmed a leak in 18 (3.5 % of all the dilatations done) of the cases. 11 had minor

and confined leak and were managed conservatively. They all survived. 7 had major leak. Out of them 3 died resulting in 43 % mortality for a major esophageal leak and an overall 0.59 % total procedure related mortality. In all the 18 patients with perforation, leak was seen at the level of stricture. In all these patients except one (where leak was very large and nearly all the barium suspension leaked into pleural cavity), barium was also seen flowing into stomach. In 9 out of 11 patients having minor and confined leak, a nasogastric tube could successfully be passed into stomach.

Table -1: Pre-discharge check list for esophageal dilatation patients

1. **Vital Sign**
 - Pulse _____/min
 - Temperature _____°F
 - B.P _____mm Hg
 2. **Pain in the chest**
Yes / No
 3. **Surgical emphysema in the neck**
Yes / No
 4. **Major Haemoptysis**
Yes / No
 5. **Bilateral good and equal air entry**
Yes / No
 6. **Tolerance of oral intake**
-
7. **Chest X-Ray**
Not done / Normal / suspicious or abnormal
 8. **Follow –up arrangement**

Table 2: Break down of all the dilatation (n=531)

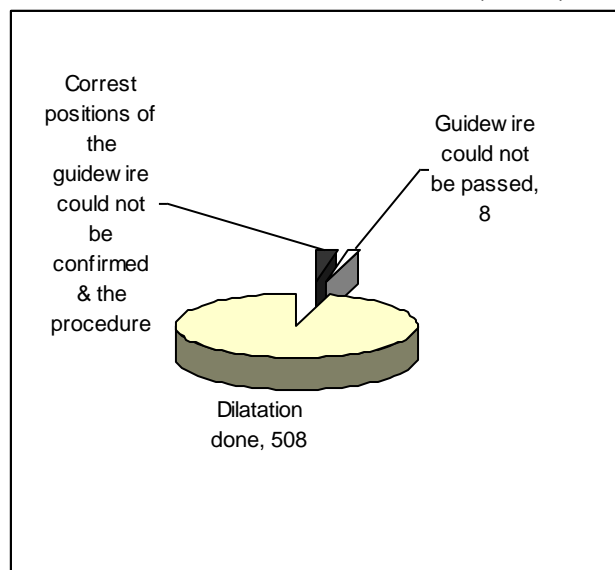


Table 3: Age, sex and etiology wise distribution of patients undergoing esophageal dilatation

| Age group | =n | Number of patients | | | | | | | |
|--------------|------------|--------------------|----|------------------|----|--------|-----------|-----------------------|-----------|
| | | Sex wise | | Etiology wise | | | | | |
| | | | | Corrosive intake | | Reflux | Achalasia | Anastomotic stricture | Malignant |
| Suicide | Accidental | | | | | | | | |
| < 1 years | None | - | - | - | - | - | - | - | - |
| 1-2 years | 17 | Male | 10 | - | 10 | - | - | - | - |
| | | Female | 7 | - | 7 | - | - | - | - |
| >2-8 years | 48 | Male | 33 | - | 28 | 2 | 1 | 2 | - |
| | | Female | 15 | - | 12 | 2 | 1 | - | - |
| >8-12 years | 14 | Male | 10 | - | 10 | - | - | - | - |
| | | female | 4 | - | 3 | - | 1 | - | - |
| >12-45 years | 59 | Male | 17 | 6 | 3 | 3 | - | 1 | 4 |
| | | Female | 42 | 21 | 2 | 3 | 3 | 8 | 5 |
| >45 years | 31 | Male | 18 | - | 2 | 3 | 3 | 2 | 8 |
| | | Female | 13 | 2 | - | 2 | 3 | 3 | 3 |

DISCUSSION

We, at our institution, provide tertiary care service to south Punjab, upper Sindh, and adjacent areas of NWFP and Baluchistan. This vast territory is unfortunately also the most underdeveloped both socially and economically. Corrosive, usually acid, ingestion is a common mode of attempting suicide in this area. More over, accidental corrosive ingestion, especially in children, is also not uncommon. We at our center therefore see a large number of patients with corrosive injury to esophagus. In addition, one of the authors [IHK] has special interest in esophageal surgery therefore other esophageal pathologies like peptic strictures, anastomotic strictures, achlasia, malignant strictures etc are also regularly treated. Unfortunately, we do not have access to a flexible gastroscope in our unit and a single image intensifier is shared between all the operating theaters. This dictates that for practical purposes image intensifier is not available to us most of the times. We, therefore, started doing esophageal dilatations under short general anesthesia using rigid scope and Savory Gilliard dilator system slightly modifying the technique described in literature^{3,6,11}. It is established that straight forward dilatations can safely be carried out with out image intensifier^{2,13}. We exclusively use abdominal palpation to check position of the guide wire in stomach. A correctly placed guide wire will follow greater curve of the stomach from left to right^{4,5,6,9,10} and this can be appreciated on abdominal palpation. Some dilatations were done under L/A± sedation by one of the authors [IHK] in his practice. Slowly, a procedure that was started out of desperation proved so easy, safe and practical that this is now our standard method of doing esophageal dilatation. In a very large majority of patients guide wire position can safely be confirmed in the stomach by palpatory method (>95% in our series). Where

doubt exists, safety of the patient is not compromised. In such cases either image intensifier is called or the procedure is abandoned and repeated at a later date. When image intensifier is not available, a per-operative X-Ray of lower chest and upper abdomen is obtained to check position of the guide wire. In this way, a major expense is spared and resources used more efficiently. Sparing use of image intensifier becomes more important when risk of radiation exposure is taken into equation. In our series, 53% of patients underwent repeated dilatations. Each of these patients had an average of 7.2 dilatations (range: 2-14 dilatations) over 29 months period. This phenomenon is in line with natural history of benign strictures and many authors have noted that such patients are likely to require repeated dilatation on regular basis^{7,12}. Moreover because of the nature of their problem, these patients under go many chest X-Rays and barium studies. All this adds to the possible risks associated with radiation exposure. This is particularly the case with children, who on one hand are at the greatest risk of developing malignancies following repeated exposure to radiation and on the other hand they form the group where digital palpation of guide wire is the easiest because of their thin abdominal wall. In our experience, out of total of 531 procedures, 79(15%) dilatations were performed in children under 12 years of age. Although the radiation dose delivered during fluoroscopy can be variable and most operators try to keep the dose to minimum but the concept of a safe dose is an illusion. This is because "there is no threshold for mutation rate; hence there is no such thing as a safe dose"¹. Radiation exposure therefore should be avoided whenever possible.

It is also worth emphasizing that in patients who sustained an esophageal perforation, on barium study all the 18 perforations were seen at the level of stricture. In 17 of these patients, barium was seen

flowing into the stomach as well. More over in 9 out of 11 patients, who had a minor leak, we were able to pass a nasogastric tube into the stomach. We therefore deduce that in at least 17 out of these 18 patients, guide wire was in the correct position. Perforations that did take place were due to error of judgment in selecting wrong size of dilator rather than wrong placement of wire. In cases where guide wire position is wrong, the wire makes a false passage above the stricture. Dilator passed over this wire dilates the false passage, rupturing the esophagus while original lumen of the esophagus remains closed at the level of the stricture. In these cases, neither a nasogastric tube can be passed into the stomach nor barium is seen flowing into the stomach.

Esophageal perforation is a well established and dreaded complication of dilatation^{5,7,13,14}. However, it's incidence can be reduced by careful application of a safe technique. Moreover, a well functioning protocol of postoperative care will ensure that patients sustaining such complication are picked up and treated early, thereby keeping the morbidity and mortality under check.

CONCLUSION

1. Digital palpation of Guide wire in the abdomen is safe, practical and efficient way of confirming correct position of the guide wire before esophageal dilatation.
2. With careful application of the technique, only in a very small fraction of patients image intensifier will be needed.

REFERENCES

1. Armstrong P: Hazards of exposure to diagnostic radiation.P.13. In Armstrong P, Wastie ML: Diagnostic Imaging, Blackwell, oxford, 1992.

2. Bailey AD, Goldner F: Can clinicians accurately asses esophageal dilation without fluoroscopy? *Gastrointest Endosc* 36:373,1990
3. Barkin JS, Taub S, Rogers AI: The safety of combined endoscopy, biopsy and dilation in esophageal strictures. *Am J Gastroenterol*76:23, 1981
4. Celestin LR, Cambell WB: A new and safe system for esophageal dilatation. *Lancet* 1:74, 1981
5. Cox JGC, Winter RK, Maslin SC et al.: Ballon or bougie for dilatation of benign esophageal stricture? An interim report of a randomized controlled trail. *Gut* 29:1741, 1988
6. Dumon JF et al: A new method of esophageal dilatation using Savory-Gillard bougies. *Gastrointest Endosc* 31:379,1985
7. Earlam R, Cunha-Melo JR: Benign oesophageal strictures: Historical and technical aspects of dilation. *Br J Surg* 68:829,1981
8. Glick ME: Clinical course of esophageal stricture managed by bougienage. *Dig Dis Sci* 27:884, 1982.
9. Hine KR, Hawkey CJ, Atkinson M, Holmes GKT: Comparison of the Eder-Puestow and Celestin techniques for dilating benign oesophageal strictures, *Gut* 25:1100, 1984.
10. Lilly J, McCaffery TD: Esophageal strictures dilation: a new method adapted to the fiberoptic esophagoscope. *Am J Dig Dis* 16:1137 1971.
11. Monnier P, Hsieh V, Savery M: Endoscopic treatment of esophageal stenosis using Savary-Gilliard bougies: technical innovation. *Acta Endoscopica* 15:119,1985
12. Patterson DJ , Graham DY, Lacey Smith J et al : Natural history benign esophageal stricture treated by dilatation.*Gastroenterology* 85 : 346,1983
13. Rice TW: Dilatation of peptic stricture.P294-302. In Pearson FG et al (ed): *Esophageal Surgery*, Churchill Livingstone, Edinburgh, 1995.
14. Tulman AB, Boyce HW Jr.: Complications of esophageal dilation and guidelines for their prevention. *Gastrointest Endosc* 27:229 , 1981.

ADDENDUM

1. The name of third author in article titled "**Addition of Amikacin and Levofloxacin is Associated with Higher Culture Conversion Rate in Pulmonary Tuberculosis**" published in Vol. 5, Issue 2, Jul – Sep 2011 with incorrect spellings. The correct spellings of the author's name is as MUHAMMAD SIDDIQUE, Assistant Professor of Medicine, CMH Lahore Medical College
2. The name of fourth author was not published which is as follows: MUHAMMAD YAQOOB Associate professor Lahore Medical and Dental College