

sults. Individuals for whom previous PD has failed or who prefer a more effective procedure initially should know about all of the surgical alternatives. When pathologic gastroesophageal reflux is present, the M-NF is the obvious procedure of choice and can be performed with confidence that obstruction of the esophagus is a remote possibility. In patients with dysphagia, the choice of EM or M-NF must depend on the experience and bias of the surgeon; both of these procedures are effective, and both are acceptable treatments based on all available evidence. Importantly, esophagomyotomy with fundoplication can be successfully performed without obstruction of the esophagus if a floppy fundoplication is performed.

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### References

1. Vantrappen G, Hellemans J. Treatment of achalasia and related motor disorders. *Gastroenterology* 1980; 79:144-154.
2. Csendes A, Velasco N, Braghetto I, Henriguez A. A prospective randomized study comparing forceful dilatation and esophagomyotomy in patients with achalasia of the esophagus. *Gastroenterology* 1981; 80:789-795.
3. Donahue PE, Nyhus LM. Exposure of the periesophageal space. *Surg Gynecol Obstet* 1981; 152:218-220.
4. Donahue PE, Bombeck CT, Samelson S, Nyhus LM. The floppy Nissen fundoplication: effective long-term control of pathologic reflux. *Arch Surg* 1985; 120:663-668.
5. Donahue PE. Discussion of intrathoracic fundoplication. *Am J Surg* 1982; 143:35.
6. Cohen S, Lipshutz W. Quantitation of lower esophageal sphincter (LES) dysfunction in achalasia: an objective guide to therapy. *Gastroenterology* 1971; 60:650-A.
7. Heitmann P. Intraluminale manometrische untersuchungen vor und nach pneumatischer dehnung bei der achalasia der speiserohre. *Vehr Dtsch Ges Inn Med* 1971; 77:488-489.
8. Holloway RH, Krosin G, Lange RC, et al. Radionuclide esophageal emptying of a solid meal to quantitate results of therapy in achalasia. *Gastroenterology* 1983; 84:771-776.
9. Arvanitakis C. Achalasia of the esophagus: a reappraisal of esophagomyotomy vs. forceful pneumatic dilatation. *Am J Dig Dis* 1975; 20:841-846.
10. Yon J, Christensen J. An uncontrolled comparison of treatments of achalasia. *Ann Surg* 1975; 182:672-676.
11. Vantrappen G, Janssens J. To dilate or to operate? That is the question. *Gut* 1983; 24:1013-1019.
12. Skinner DB. Myotomy and achalasia (editorial). *Ann Thorac Surg* 1984; 37:183-184.
13. Okike U, Payne WS, Neufeld DM, et al. Esophagomyotomy versus forceful dilation for achalasia of the esophagus: results in 899 patients. *Ann Thorac Surg* 1979; 28:119-125.
14. Lishman AH, Dellipiani AW. Management of achalasia of the cardia by forced pneumatic dilation. *Gut* 1982; 23:541-544.
15. Ellis F, Cole FL. Reflux after cardiomyotomy. *Gut* 1965; 6:80-84.
16. Pai GP, Ellison RG, Rubin JW, Moore HV. Two decades of experience with modified Heller's myotomy for achalasia. *Ann Thorac Surg* 1984; 38:201-205.
17. Ellis FH Jr, Crozier RE, Watkins E Jr. Operation for esophageal achalasia: results of esophagomyotomy without an antireflux operation. *J Thorac Cardiovasc Surg* 1984; 88:344-351.
18. Murray GF, Battaglini JW, Keagy BA, et al. Selective application of fundoplication in achalasia. *Ann Thorac Surg* 1984; 37:185-189.
19. Rossetti M. Osophago-cardiomyotomie und fundoplicatio: eine physiologische operation bei cardiospasmus und megaesophagus. *J Suisse Chir* 1963; 93:925-931.
20. Menguy R. Management of achalasia by transabdominal cardiomyotomy and fundoplication. *Surg Gynecol Obstet* 1971; 133:482-484.
21. Duranceau W, LaFontaine ER, Vallieres B. Effects of total fundoplication on function of the esophagus after myotomy for achalasia. *Am J Surg* 1982; 143:22-28.
22. Orringer MB, Orringer JS, Dabich L, Zarafonitis CJD. Combined Collis gastroplasty-fundoplication operations for scleroderma reflux esophagitis. *Surgery* 1981; 90:624.
23. Heimlich HJ. Discussion of esophagomyotomy vs. dilation for achalasia. *Ann Thorac Surg* 1979; 28:124.

### DISCUSSION

DR. DAVID B. SKINNER (Chicago, Illinois): Dr. Hutson, I apologize for rising again, but it would not have been neighborly to refuse to discuss this paper after Dr. Nyhus and colleagues sent me the manuscript and asked me to open the discussion. The data obtained by Drs. Donahue, Bombeck, et al. are excellent and make a strong case for their approach, and the presentation by Dr. Nyhus was both informative and illuminating. Not surprisingly, in view of the healthy interchange we have in Chicago between our two departments, I generally agree with their thesis and their observations. Our approaches are slightly different, but the rationale behind them is similar.

The major controversy in this field is whether to add an antireflux repair to the myotomy or not. I think we both are in agreement on the need for a long myotomy. In terms of analyzing whether you should add an antireflux repair or not, we have looked at those cases that were sent to us because they had a failed previous operation for achalasia. I have operated on 17 such patients in recent years. Fifteen just had a Heller myotomy of the type that Dr. Nyhus described. In seven, the reason for reoperation was a peptic stricture from reflux esophagitis, and in eight the reason was an inadequate carrying of the myotomy down onto the stomach. In those 15 patients out of the 17, reoperation would have been avoided had the approach described today been employed at the first operation. That is, carry the myotomy onto the stomach, do a long myotomy, and then add a fundoplication of some type.

The other two failures were patients who had a total fundoplication but not enough floppiness, and it was made too tight. Actually, one of them, I think, may have come from a neighboring institution in Chicago, and that points out the only disagreement I have with this paper. That is, you can and should do a partial fundoplication as we showed on the slide in our earlier paper and avoid the risk of getting the Nissen too tight. I have used that operation, long myotomy with partial fundoplication, now in 35 consecutive primary operations for achalasia, and none of them has had to have reoperations for failure of that first operation to control his symptoms or reflux.

I do have a couple of questions. What was the rationale for carrying the myotomy so far down onto the stomach? After you knew you were actually on the stomach, you went down 3 or 4 cm farther.

I would like some further comments on this question of pneumatic dilatation interfering with further surgery. It depends on whether Dr. Nyhus put the fair results from the Heller with the good or with the poor. As I looked at his slide, if he lumped fair and poor together, it was a 50% failure with a previous pneumatic dilatation. If you lumped fair with the good, then the results looked better. Perhaps, the answer relates to DRGs, and how many dilatations with a net profit on each does it take to make up for the deficit for one good myotomy?

DR. ROBERT E. CONDON (Milwaukee, Wisconsin): Let me just take a moment to iterate comments that I made last evening and indicate to

all of you how delighted I am that you have seen fit to welcome Marcio and me into the fellowship of the Southern. We both feel very proud of your approbation, and we look forward to a long and happy association.

I want also to thank Professor Nyhus and company for asking me to discuss their paper and for their courtesy in giving me a copy of their manuscript this morning so I might have at least a little chance to look at it before standing up to discuss the paper. I do not really have any major disagreement with the general thrust of their presentation, but I would like to raise a slight note of caution and ask a couple of questions.

We all recognize that achalasia is a very variable disease with a variable response to any form of treatment. As Lloyd Nyhus indicated in his presentation, their case material contains within it a selection bias toward failure of pneumatic dilation as a treatment modality, and so in this general context the caution I would like to raise concerns the employment of balloon dilation in the management of this disorder. The fact is that some patients do very well with balloon dilation. Some of them need only a single dilation every couple of years, and they seem to kind of stagger along doing reasonably well and get by for a long time, if not functionally forever, without the need for an operation.

On the other hand, there are other patients who do not do well, who require repetitive dilations over a relatively short period of time, or who decompensate even while they seem to have had relief of their dysphagia by a series of balloon dilations. Thus, I would not make any hard and fast rule that two dilations are appropriate. I think two is appropriate for some patients, but that many more than that may be appropriate for occasional patients.

I would support the approach through the abdomen in the treatment of this disorder. Having managed cases from both sides of the diaphragm, I think I have been personally more effective using the abdominal approach, a long myotomy, which you can carry up all the way to the level of the pulmonary veins through the hiatus, and associated loose fundoplication to prevent subsequent postoperative reflux.

Unlike some other surgeons who deal much more often with this disorder, some of whom are members of this Association, I just can not seem to hit consistently that very narrow line between an effective myotomy that consistently relieves the dysphagia and never causes reflux, and one where you just step over that very fine line, and the patient has reflux after myotomy. Reflux in these patients is a real disaster because they cannot clear their esophagus, and they get a roaring esophagitis with all of its major complications; thus, this combined approach of an extended myotomy combined with a floppy fundoplication, at least in my hands, has led to the most success.

The first question I would like to ask relates somewhat obliquely to this presentation. When is it not appropriate to use the long myotomy and floppy fundoplication approach? I have asked that question particularly in the context of patients who have a markedly decompensated esophagus who come to you with an esophagus filling, if not all, a large portion of the right chest.

I agree with Dr. Skinner's interpretation of Professor Nyhus's data that previous failure of balloon dilation seems to prognosticate a poor

result from surgical therapy. Is it really true, Lloyd, that poor results with the bag are a predictor of poor results from an operation, and, if so, why is that?

DR. DUANE G. HUTSON (Miami, Florida): I think I will take the privilege of the Moderator to ask two questions.

I frankly do not do this type of surgery, but I recall that, when we used to do funduplications, we had to make the tension on the wrap just right or it would wind up around the pylorus.

I was not sure if you were saying floppy or sloppy there for a while, but I would like to ask you if you have had a problem with these floppy ones slipping down around the stomach.

The second thing is, how do you recognize the gastroesophageal junction from the outside? You talk about 5 mm. That would seem difficult to accomplish.

DR. PHILIP E. DONAHUE (Closing discussion): I would like to thank all the discussants for their kind remarks. I will thank Dr. Hutson for letting us reiterate that one should never refer to this as a "sloppy" fundoplication—but instead as a "floppy" fundoplication.

Several of the discussants alluded to the role of pneumatic dilation and how it is performed. The rapidity of distention, the size of the bag employed, and the duration of dilation are important variables that were not controlled in our study. If they had been, the results may have been somewhat better than we report today.

However, because dilations are performed with relative ease, a maximum 1-day hospitalization, and with expectations of at least 50% success, most patients prefer this initial approach to treatment.

Dr. Condon's query about the effect of previous dilations on surgical outcomes is an important one. Since patients with mild symptoms were usually much better off after operation than prior to surgical intervention, we believe the conclusion that dilation does not affect outcomes is justified.

As to the operation that is chosen, we find the extended myotomy desirable just for the reason that Dr. Hutson implied. It is often difficult to precisely define the gastroesophageal junction; it is easy to be 5 mm short or 5 mm in excess. Extended myotomy extending 3 cm onto the stomach allows certainty that all of the obstructing elements for swallowing have been removed, fundoplication is complementary, and, when performed in the "floppy" manner, *i.e.*, as loosely as possible, obstruction of the esophagus will not occur.

Are there contraindications for this approach? We do not think so at this time. Ten of our 13 patients who had extended myotomy with fundoplication had a grossly distended esophagus ( $10 \pm 2$  cm). In fact, extended myotomy with fundoplication is our treatment of choice for achalasia.

On that note, and with a final thank you to my coauthors and the society for the privilege of closing this paper, I will conclude.