the intent of studying Cimetadine™ (Smithkline and French Labs, Philadelphia, PA). The results of this study indicated that prophylactic decompression was unnecessary, and that Cimetadine lowered nasogastric output on the first postoperative day, but did not prevent vomiting.

Recently, two additional studies have been published. One hundred thirty-eight consecutive patients undergoing elective colon and rectal resections were randomly assigned to have a long intestinal ("Cantor") tube before operation, a nasogastric tube placed during operation, or no gastrointestinal tube at all. There were no significant differences in number of postoperative complications, length of hospital stay, or duration of postoperative ileus found in these three groups.[13] Racette,[14] in a randomized, prospective study of 56 patients undergoing elective colon and rectal surgery, with 28 patients receiving nasogastric tubes, and 28 patients who did not, found more abdominal distention in the nondecompressed group, but found that 46% of the decompressed patients had atelectasis *versus* 17% of the patients who were not decompressed. Other parameters were not significantly different.

Our study differs from previous studies in several ways. A large number of patients were enrolled, and only one variable (tube or no tube) was studied. No drugs promoting return of bowel activity were used.

We have computed a cost (tube, suction apparatus, nursing time) of $150 for nasogastric decompression. In Group II, using this cost basis, $36,000 was saved in 221 patients not routinely receiving postoperative nasogastric decompression. In the entire series, almost $65,000 could have been saved by eliminating routine decompression. If needed, a tube can be placed fairly easily without untoward patient discomfort by first anesthetizing the nasopharynx and oropharynx with Lidocaine spray (Roxane Labs, Columbus, MO) and Cetacaine spray (Cetylite Industries, Pennsauken, NJ).

In summary, while there was a significant increase in nausea, vomiting, and abdominal distention in the group of patients who did not undergo postoperative nasogastric decompression, there was no difference in major complications. Indeed, 87% of patients not having routine postoperative nasogastric decompression never required postoperative nasogastric intubation. Five per cent of patients undergoing routine postoperative nasogastric decompression required reintubation, for a differential of 8% between the two groups. Therefore, most patients after colon and rectal surgery do not require postoperative nasogastric decompression. We were unable, however, to discern any predictive factors for the small group of patients who would require NG decompression. We concluded that routine use of a nasogastric tube is uncomfortable for the patient, expensive, and unnecessary in the great majority of patients and, therefore, should be eliminated as a routine procedure in elective colon and rectal surgery.

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Discussion

DR. FORREST DEAN GRIFFEN (Shreveport, Louisiana): It is my pleasure to discuss this landmark work and to support the concept that nasogastric decompression is frequently unnecessary in colon and rectal surgery.

My mentor and associate, Dr. Charles Knight, and I have been using nasogastric decompression selectively for some time now, but we have been a little concerned that the colon or rectal anastomosis without nasogastric suction might be at increased risk for complications. The data presented here today at last reassures us that our concern has no basis.

Stimulated by this manuscript, I decided to review our most recent 100 consecutive circumferential colon and rectal anastomoses without protective colostomy, emergent and elective, to focus on what one might expect to occur out of protocol in a typical surgical practice. You will notice that I have changed the exclusion criteria to focus on the anastomosis rather than the ileus. Our cases are slightly weighted toward low anterior resection because of our interest in the double stapling technique (Slide 1). There were 27 cases treated with nasogastric decompression as part of their initial care, leaving 73 without tubes (Slide 2). All but 5 of the 27 patients with tubes would have been excluded from randomization in the Mayo series because of the presence of perforation (7), obstruction (5), GI bleeding (1), fistula (2), adhesions (2), gangrene (1), and prior

ostomy (4). Our group of 73 patients treated initially without nasogastric tubes was somewhat sicker than the patients in the Mayo Clinic's series, because 20 would have been excluded from randomization for the same reasons. All of the perforations in our cases were contained abscesses or sinuses because free perforations are not candidates for anastomosis without diversion. All obstructions were either associated with right hemicolectomy or the obstruction was partial, allowing for adequate bowel preparation (Slide 3). One anastomotic leak occurred in the 27 cases treated initially with NG suction. This was a patient with a perforated cecal diverticulum who after right colectomy and enterocolostomy developed a perianastomotic abscess that required surgical drainage. The resulting fistula healed spontaneously. One leak occurred in the 73 cases treated initially without NG suction in a patient who, after low anterior resection, drained fecalent material through the drain site. The fistula healed without surgical intervention. Two deaths occurred, both with NG tubes and both were emergency cases in which death was related to organ-system failure without anastomotic complications. No deaths occurred in the group treated initially without NG decompression. Fourteen per cent of patients chosen for treatment without NG suction required delayed tube placement for ileus.

I have a single question. What are you doing now?

DR. FRANCIS C. NANCE (Livingston, New Jersey): I do have a couple of quibbles with the way the authors conducted the study and would like to ask them to discuss these. Some of these were covered by Dean Griffen.

The largest quibble I have is that more than one half of the patients potentially entered into the study were excluded, and I would have been much more happy with the study and much more pleased with it if they had tried to include virtually all their patients in their series, although I am sure there are some attending physicians at the Mayo who would have not viewed that with great enthusiasm.

The other is that their protocol called for the NG tube to be inserted during the operation, and if you are saving money, why use a nasogastric tube for the two or three hours of the operation and then remove it in the recovery room? If we are not going to use it, let's not use it.

And finally, I would like to reiterate Dean's question because I think it is important. Has this study really changed the practice at the Mayo Clinic?

Many of these studies are done, and they don't seem to change our way of practice, and I wonder if this has actually changed the practice and whether you have any data about reduction in the use of the nasogastric tube.

I think it was a nice study mainly because I agree with it.

DR. GARDNER W. SMITH (Baltimore, Maryland): As Dr. Woodward said this morning about Dr. Beahr's paper, it is always nice to have someone present data that supports your own personal prejudice. That is particularly true when the report comes from the Mayo Clinic because they always have incontestably huge numbers.

Accordingly, it is with pleasure that I rise to congratulate Dr. van Heerden and his colleagues and indicate my enthusiasm for their conclusions. On the other hand, I am a little hesitant to cite our own data, which is now quite preliminary, and which in any case will never achieve the volume of the data that was presented this afternoon.

Nonetheless, we have recently initiated a similar prospective, randomized study of the use of nasogastric tubes, in this case involving not just colorectal surgery but for all elective abdominal operations. The exclusion criteria are much the same as those listed by Dr. van Heerden. While avoiding any mention of numbers, at this point I can say that thus far about one third of the randomized patients in our study have had colorectal surgery. About one half of them have had biliary tract surgery and the remaining patients are mostly aortic vascular procedures of one kind or another, with scattered odd operations tossed in as well.

Thus far no patient randomized not to receive a nasogastric tube has required the postoperative insertion of one, and there has only been one pulmonary complication in that group so far. On the other hand, among the patients who have been randomized to receive nasogastric tubes, just over 50% of them have developed either postoperative atelectasis or pneumonia. We have seen no other major complications in either arm of the study at this point.

With respect to what Dr. van Heerden referred to as minor problems such as abdominal distension, nausea, and vomiting, in our experience these have been equally common in both groups. I have to concede that this result may to some extent be related to the nursing care received by patients who have nasogastric tubes, but I would also point out that, in fact, both groups have responded well to antiemetic therapy.

I conclude this discussion then by thanking Dr. van Heerden and his colleagues for reinforcing our prejudice even though they have clearly stolen our thunder. His conclusion that most patients do not need nasogastric tubes is surely correct, and I anticipate that we will eventually be able to demonstrate the same thing.

I do have just a few questions. In the first place, we have excluded patients who are on H2 Receptor blockers because of their effect on gastric secretory activity, and I wonder if this is a necessary exclusion.

Second, we have been rather liberal in the use of antiemetic medications for patients in both arms of the study, and I wonder if you would consider that appropriate or not. Finally, it has been my qualitative observation, although I don't have the numbers to prove it at the moment, that among those patients having similar operations, those randomized for nasogastric tube decompression seem to take longer to regain intestinal function than those who do not have a nasogastric tube. I wonder what your impression or experience has been in this regard as well.

DR. MICHAEL YARBOROUGH (Raleigh, North Carolina): When Dr. Wolff invited me to discuss this paper, I asked him if there were any particular points he would like me to address, and he said, no, not particularly, that I could criticize him, I could agree with him, or I could simply say, "I thought I taught you better than that." And I thought I had taught him better than this.

However, I think at this point I can learn from him.

I would like to congratulate Dr. van Heerden, Dr. Wolff, and their associates on what I think is an excellent paper. It is a very crisp study, and it certainly answers a question that I have had in my own mind for a long time. It comes up every week or so in making rounds on postoperative colectomies—on the third or fourth day when the NG tube hasn't drained anything, the patient is complaining, and you wonder if the tube is really doing any good. I think they have provided an answer to the question.

I do think, though, that the key here is exercising good judgment in patient selection. I certainly think that their exclusion criteria are important to keep in mind for the average practicing surgeon, like myself. The patient with many adhesions or intra-abdominal sepsis or other such problems is not the candidate for nondecompression.

I have simply three questions for Dr. Wolff. Number one, I would like to know if he has ever had an NG tube in himself.

I would also like to know if he thinks there is a role in these patients for the use of Metachlorpromide. And last, in that rare instance that we have all experienced when the operation just went as slickly as boiled okra but somehow there is an anastomotic disruption about the ninth or tenth postoperative day, is Dr. Wolff going to help to defend us when the plaintiff attorneys have us by our throats?

DR. BRUCE WOLFF (Closing discussion): Dr. Griffen, this study arose out of a conversation Dr. van Heerden and I had at this meeting 4 years ago, and I won't try to convince you that either of us lacked preconceived notions about the outcome. Dr. van Heerden's bias, of course, was that you didn't need NG tubes, and my bias, on the basis of my training, was that we should routinely put NG tubes in these patients. As you see, Dr. van Heerden won this little bet, and as a matter of fact, I have changed my practice. I no longer routinely put NG tubes in patients. I follow the criteria of exclusion that are listed for that, and most of my colleagues have joined me in that as well.

Dr. Nance, the 1391 patients who were declared "eligible" is misleading because "eligible" is actually not a correct term. The surgeons listed as authors performed that number of operations during that 2.5-year period, and I apologize for specious language. Many of those patients weren't eligible. There were emergency operations, and many of those patients were excluded for reasons of obstruction, perforation, and so forth. A number of those patients, as you might expect, refused to participate in the study as well.

We approached a patient with the idea that nasogastric decompression was our routine practice and many patients said, "If that is your routine, that is what I want. I don't want to participate in the study."

The third group or category was based on the fact that we simply forgot to ask patients to enroll in our study; but the 535 patients who were enrolled, I think, are very representative of our practice, and if we look at the results in these operations, as far as wound infection rate, age, diagnosis, type of operation, and so forth, it tallies very nicely with the other studies we have done within the institution. I don't think this is a select group of patients, and is very representative of our practice.

The use of the NG tube intraoperatively is a habit, and you are right, it is an added expense. It costs $6.60. I think it is worth that to deflate the stomach, particularly after a patient has had a Golytely® prep, which we are using now. There is still quite a bit of air and fluid in the stomach and duodenum at the start of the operation, and we like to remove this fluid and proceed with the operation in a more uncluttered field.

Dr. Smith, I am glad to see that you are doing your own study, and I look forward very much to seeing the final results of that work. You mentioned respiratory problems in 50% of patients. There is a study by Racette et al. from Kansas, a small study, nevertheless prospective and randomized, and he found that the patients with nasogastric decompression had a large percentage, 46%, of patients with atelectasis. In the group that didn't have the tube in his study, he only found 17% who had similar pulmonary problems.

H2 blockers have been studied recently at Louisville by Drs. Cheadle, Vitale et al., and they found that the addition of cimetidine, in the hope of cutting down gastric secretion, did that only the first day after operation but did not affect the incidence of vomiting. There were 4 groups, 2 with cimetidine and 2 without cimetidine, with tube and without, and it didn't make any difference among the groups.

There has been a small study by Nemer with metaclopromide used in two thirds of his patients. It was a small study of 65 patients. Metaclopromide didn't seem to help either group (with or without tube) but Nemer felt that 90% of his patients could have gotten by without nasogastric decompression.

Dr. Smith, the return of function for the bowel in both of these groups in our study was 94 hours as a mean, so we didn't find any difference at all in those two groups.

Dr. Yarborough, since you asked, yes, I did have a nasogastric tube inserted last week by one of my residents just to anticipate a question like that. Let me tell you, it was very uncomfortable. I had a pharyngitis for two days. I think there is a way that you can place nasogastric tubes in patients after operation by anesthetizing the oropharynx and nasopharynx with cetacaine spray and then 4% Lidocaine spray in the nares. This makes this insertion not nearly so uncomfortable for an awake patient as it might seem, and we have started to use these anesthetics. I think the data speaks for itself, and I would be happy to participate in any defense you may need.