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Clinical Value of Duodenojejunal Manometry

Its Usefulness in Diagnosis and Management of Patients with Gastrointestinal Symptoms

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The records of all patients who had dudenojejunal manometry (DJM) from 1989 to 1995 were retrospectively reviewed. We evaluated the main symptoms of the patients, the indication for the study, its result, and the impact on therapy and management. One hundred sixteen patients out of 154 were included in the study, of whom 96 were women and 20 were men, with a mean age of 41.2 years. Twenty-five had perfused tube studies, and 91 had prolonged ambulatory recordings. Forty-one patients were referred for evaluation of abdominal pain, 34 for chronic constipation, 24 for nausea and vomiting, 8 for pseudoobstruction, and the remaining 9 for other reasons. All patients had appropriate endoscopic, radiographic, or scintigraphic studies prior to manometry. Forty-seven (40.5%) had abnormal manometry: 20 of 41 (48.8%) for abdominal pain, 7 of 34 (20.6%) for chronic constipation, 10 of 24 (41.7%) for nausea and vomiting, 5 of 8 (62.5%) for pseudoobstruction, and 5 of 9 (55.6%) for the miscellaneous group. The various subgroups did not have specific patterns of motor abnormalities. In 22 patients (18.9%) manometry helped in the choice of therapy: in 15 patients by affecting surgical approach, particularly in the constipation group, and in 7 patients by affecting feeding options and prokinetic agents. Detection of motor abnormalities was helpful in patients with severe symptoms thought to have functional disease even when no specific therapy was rendered. Thus, DJM was abnormal in ⅔ patients referred for evaluation of suspected motility disorders. It directly affected therapy in approximately ⅕ patients, particularly in those with constipation. It is helpful in the management of patients even when specific therapy is not rendered, particularly in those with abdominal pain. The modest impact on specific therapy is related to limited availability of effective prokinetic drugs and the limited specificity and predictive value of tests results.

KEY WORDS: small bowel; manometry; outcome analysis.

Recording of small bowel and antroduodenal motility, for clinical evaluation of patients with gastrointestinal symptoms, has become popular in the last two decades with the introduction of improved recording techniques: the low-compliance perfused system (1), followed by catheters with miniature strain gauge pressure transducers (2), and lately, the development of solid state recorders (3). Regardless of the technique used, or the extent of the bowel monitored, tests of upper gut motility have been performed to help distinguish organic from functional intestinal disorders, to differentiate intestinal obstruction from pseudoobstruction, and to try to determine whether

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TABLE 1

Subgroup	*Number (%)*	*Number (%) with abnormal DJM*	*Number (%) with impact on therapy*
Abdominal pain	41(35.3)	20(48.8)	5(12.2)
Chronic constipation	34(29.3)	7(20.6)	13(38.2)
Nausea and vomiting	24(20.7)	10(41.7)	3(12.5)
Pseudoobstruction	8(6.9)	5(62.5)	1(12.5)
Miscellaneous	9(7.8)	5(55.6)	—
Total	116	47(40.5)	22(18.9)

the underlying pathology is visceral myopathy or neuropathy (4).

Despite some attempts to determine the clinical usefulness of upper gut manometry in the diagnosis and management of patients with gastrointestinal symptoms (5, 6) questions concerning the clinical role of the technique remain. In order to better define the role of intestinal manometry in clinical practice we reviewed our experience with this technique and tried to answer the following questions: What were the main symptoms of the patients studied? What were the indications for the study? What were the results of the tests in the various groups? Finally, what was the impact of the test on the management and therapy of the patients.

MATERIALS AND METHODS

Patients. We conducted a retrospective review of the records of all the patients who had upper gut motility studies in our center from 1989 to 1995, for a period of 5½ years. In each patient we reviewed the reasons for referral to the gastroenterology service; the indications for manometry; the clinical, radiologic, and endoscopic investigations performed; and treatment rendered. We followed the clinical course of each patient as documented in the chart. The reports and results of manometric studies were obtained from each record. All studies were interpreted by one of two gastroenterologists involved in small bowel manometry in our center.

Upper Gut Manometry. Initial studies (25 patients) were performed using the perfused tube technique, in which a multilumen catheter with side holes in the antrum, duodenum, and proximal jejunum is perfused by a low-compliance pump (1). These were stationary studies and data were obtained during 3 hr of fasting and 2 hr of postprandial period. Later studies (91 patients) were performed using solid-state recorders and catheters with incorporated strain-gauge pressure transducers. Initially catheters had three pressure sensors; later they five. These latter studies were ambulatory, and recordings were obtained during 6–7 hr of fasting, 4–5 hr of the postprandial period, and about 6–7 hr of sleep (7). Meals were standardized, and studies in patients who consumed less than 400 kcal were not included in the analysis. Results were compared with studies in healthy control subjects done in our center, using both techniques, performed under similar study conditions.

Analysis. Each record was reviewed and a number of variables determined: (1) Main symptom—defined as the reason that prompted the patient to seek medical advice. Although patients commonly reported more than one gastrointestinal symptom, only the main one was considered for analysis. (2) Indication for manometry—defined as the reason for obtaining the manometric study as stated by the referring gastroenterologist. Two indications were determined: one for evaluation of unexplained symptoms, eg, abdominal pain or nausea and vomiting, etc, and the other for establishing the extent of dysmotility in patients with proven motor abnormality in other segments of the gut, eg, patients with slow transit constipation considered for colectomy. (3) The results of the manometric study were determined either as normal or abnormal. (4) The impact of the result of manometry on the management of the patient and the choice of therapeutic measures was determined. A positive impact implies that the result of manometry helped to choose a specific treatment for the patient.

Criteria for abnormal motor activity were based on data collected in our center and data reported by other laboratories: (1) an abnormal configuration and migration pattern of phase III of the migrating motor complex (MMC)—such as retrograde migration, simultaneous occurrence, marked overlapping of activity fronts, or activity fronts that while migrating skip one or more segments—or the absence of at least one phase III during 6–7 hr of fasting and/or 6 hrs of sleep; (2) lack of response to meal with failure to establish a fed pattern of motility; (3) patterns suggestive of intestinal obstruction such as clustered contractions in the postprandial period (8), or simultaneous prolonged contractions (9); and (4) long bursts of phasic activity with tonic elevation of baseline pressure.

RESULTS

Of 154 studies performed 116 were analyzed for the study (75.3%), and the remaining 38 patients were excluded (repeated studies, research protocols, or charts not available). Of these 116 patients, 96 (82.8%) were women, and 20 (17.2%) were men, with a mean age of 41.2 years (range 16–86 years).

The distribution of the patients according to the main symptoms, the percentage of abnormal manometry in each subgroup and the impact on therapy are presented in Table 1. Assessment of the extent of gut dysmotility was the main indication (61 patients,

52.6%), while 51 patients were studied for evaluation of unexplained symptoms (43.9%) and 4 patients (3.5%) were studied for both reasons.

Abdominal Pain. All patients in this category had severe abdominal pain that greatly interfered with their daily life at home and at work. Weight loss was documented in about half of the patients. Patients considered to have functional bowel disease were not studied. More than half the patients had biliary dyskinesia, documented by biliary manometry, but failed to improve after biliary sphincterotomy. Impact on therapy was documented in five patients: in four with regard to decisions concerning jejunal feeding and in one who underwent laparoscopic thoracic splanchnicectomy.

Constipation. All patients in this group had slow transit constipation and did poorly on various cathartic regimens. Except for two, all were women. In 10 subjects, surgery was considered: in eight patients surgery was performed following a normal DJM, and two it was deferred after demonstrating abnormal DJM.

Nausea and Vomiting. Impact on therapy was observed in three patients: in considering feeding options and prokinetic therapy in two patients with normal gastric emptying and in considering subtotal gastrectomy in a patient with severe gastroparesis refractory to medical therapy.

Pseudoobstruction. DJM was helpful in one patient in whom an organic obstruction was found following repeated investigations.

Miscellaneous. Included were patients with scleroderma, bacterial overgrowth, amyloidosis, etc. Although informative, specific therapy was not rendered as a result of the test.

No association was observed between manometric patterns and the various categories of patients. The most common manometric abnormality was postprandial hypomotility, observed in 28 patients. Abnormal fasting motility during fasting and sleep was observed in the remaining patients, of which 10 had no MMCc during the study and the rest had abnormal configuration.

DISCUSSION

Although gastric and small bowel manometry has been used extensively in the study of gut motility in humans, in both health and disease, few attempts were made to evaluate the usefulness of the technique in clinical practice. Quigley et al evaluated their experience in a small group of patients that included only those with diabetes mellitus and irritable bowel syndrome (5). They concluded that short-term antroduodenal manometry was of limited value in their patients due to technical difficulties and the marked intrinsic variability on the motor patterns in normal subjects. The usefulness of the test with regard to treatment strategies was not discussed. Bharucha et al reviewed their experience with 113 consecutive patients, seen during a period of three years, who had short-term gastroduodenal manometry for evaluation of suspected gastrointestinal motility disorders (6). However, the aim of that study was to determine the prevalence of autonomic dysfunction in that group and the value of testing for such dysfunction. Again, the value of manometry in therapeutic decision making was not discussed. Small bowel manometry may be of some help in the differential diagnosis between mechanical and intestinal pseudoobstruction (9, 10); however, it is clear that no patterns of contractions currently described are specific for certain disorders.

The current retrospective review was carried out to specifically evaluate the contribution of DJM to the management and therapy of patients undergoing this test. The study shows that in a referral motility center, DJM performed for a variety of gastrointestinal disturbances was abnormal in two of five cases and had a direct impact on therapy in one of every five patients. Because of the retrospective nature of the study, it was difficult to obtain full assessment of the impact of therapy on the patients. This important question can be better answered by a prospective study.

The most common reason for performing DJM was the evaluation of patients with abdominal pain, with biliary dyskinesia patients being a substantial component of this subgroup. This may reflect referral patterns to our center and our clinical experience indicating that intestinal dysmotility is common in patients with biliary dyskinesia who fail to respond to ablation of the biliary or pancreatic sphincter (11). While direct impact of DJM on therapy was seen in only a small number of these patients, abnormal test results were observed in approximately half of them. This can have important implications in such patients since some of them underwent psychiatric evaluation prior to referral, after extensive investigations failed to document an organic disease that could account for pain and weight loss. DJM and further studies, prompted by careful assessment of symptoms, revealed diffuse gut dysmotility in some of the patients. Thus, DJM may be beneficial in the management of such patients even if specific therapy is not rendered,

typically by avoiding extensive and repeated tests and psychiatric evaluations in patients with unexplained symptoms. Comparable observations were made in patients with noncardiac chest pain, in whom a diagnosis of an esophageal etiology of the pain resulted in significant reduction in the use of health facilities and physical disability (12). Compared to well-defined therapeutic interventions, however, such benefits are more difficult to assess and quantify.

The patients in whom the therapeutic impact of DJM was most obvious were those with chronic idiopathic constipation. Although considered a disorder of colonic motility, there is evidence for motor dysfunction in other segments of the gut in this entity (13–17). Surgical intervention is recommended for patients refractory to medical treatment (18), but relapse rates can be quite high (19). It is not clear whether the relapse rate is related to the extent of gut dysmotility, but experience in our center suggests that this may be the case. This view is supported by a recent study showing that patients with constipation and evidence of upper gut dysmotility do not respond to colectomy as well as those who have only colonic involvement (20). For this reason we do perform jejunal manometry when surgical intervention is contemplated, and the results of the test are strongly considered in the decision making. This category of patients also demonstrate how normal test results can also be useful in clinical decision making.

Patients with nausea and vomiting and those with pseudoobstruction had a high incidence of abnormal DJM, but the impact on therapy was low. This mostly reflects the fact that most patients were given various empirical treatments prior to referral and that decisions concerning jejunal feeding in patients with gastroparesis were commonly made empirically and relied on short-term trials of feeding using nasojejunal tubes. However, manometry may be helpful in selected patients who are resistant to therapy by evaluating responsiveness and dose responsiveness to prokinetic agents (21).

A number of reasons account for the modest impact that DJM has on specific therapy in patients with gut dysmotility: the limited options for drug therapy, the limited correlation between manometric patterns and pathologic processes, and the lack of clear-cut predictors of response to therapy based on the results of manometric findings. Although the last decade has seen the introduction of a number of new prokinetic agents, the options are still limited. They are further limited by tachyphylaxis and the poor response in advanced disease, particularly when a myopathy is involved (22). Recent studies have shown that pressure profiles from the gut (consistent with myopathy), paucity of migrating motor complexes (22), and vagal dysfunction (23) predict poor response to prokinetic agents. However, while these criteria may be helpful in defining subgroups of patients for clinical trials, clearly they cannot be used to exclude specific therapy in individual patients, and their usefulness in clinical practice remains to be seen. Part of the reason for the poor predictive value of manometric findings is the limited specificity of the various manometric patterns considered abnormal. This is mostly due to the fact that in most patients with dysmotility syndromes, histologic assessment of the myenteric plexus is unavailable and the likelihood that a large variety of pathologic processes share a limited repertoire of abnormal manometric patterns. Another potential reason for the limited usefulness of the test is that manometry does not provide information about the function of visceral afferents, which may be an important factor in patients with abdominal pain (24).

The data we provide reflect referral patterns and preferences prevalent in our center and may differ from other centers that practice a different approach to patients with abdominal pain or constipation. They are also specific to the type of procedure performed, and it is possible that a different type of manometry, for example, gastroduodenal, may provide different results. Although in our experience the direct impact of DJM on direct therapy was modest, it proved helpful in the management of patients, particularly those with abdominal pain. In helping to establish a reason for the symptoms, it affected patient care by leading diagnostic studies in other directions or by calling a moratorium on further studies when a diagnosis was made. These management steps are "softer" and more difficult to describe objectively. Possibly, analytic techniques to address these outcome aspects will be available in future studies. We look forward to more data from centers that perform upper gut motility, so its role in clinical practice can be defined more clearly.

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