Origin of chronic right upper quadrant pain

J G C KINCHAM AND A M DAWSON

From the Department of Gastroenterology, St Bartholomew’s Hospital, London

SUMMARY We have studied 22 consecutive patients referred for investigation of severe chronic right upper quadrant pain. The majority were women whose symptoms had been present for many years. All had undergone repeated investigations of the pancreatico-biliary, gastrointestinal, urinary, and even gynaecological systems without a satisfactory diagnosis. Most had undergone at least one abdominal operation in an unsuccessful attempt to cure their pain. In 21 of 22 patients the customary pain was completely and reproducibly mimicked by balloon distension of the small or large intestine at least one site. The trigger sites were jejunum (15), ileum (12), right colon (nine), and duodenum (six). In 12 more than one trigger site was found. Close questioning revealed features of the irritable bowel syndrome in the majority and depression in many though the symptoms were not spontaneously volunteered. Reproduction of pain has provided a convincing demonstration to this difficult group of patients that they have a sensitive gut and allows appropriate management.

Chronic right upper quadrant pain allows greater scope for diagnostic and therapeutic mismanagement than perhaps any other abdominal symptom. When those sufferers with no identifiable cause— for example, nerve root pain, local malignant or inflammatory disease have been excluded, the remainder have a number of features in common. In particular they suffer flatulent dyspepsia and find their symptoms are aggravated by fatty foods. It is in part these associated symptoms that so frequently and unjustifiably lead to a diagnosis of gall bladder disease. Despite the realisation in recent years that flatulent dyspepsia is equally common in those with or without gall stones,1-3 the myth of gall bladder dyspepsia persists. Similarly, it is still commonly held and taught that cholelithiasis may cause chronic continuous right upper quadrant pain which again is a fallacy. Gall stones, if they cause pain at all, induce biliary colic which is episodic, severe and brief, only exceptionally lasting more than a few hours.4 Another more worrying feature these patients share is the extent to which investigations are pursued and surgical manoeuvres carried out in futile attempts to find or remove the cause of the pain.

That chronic right upper quadrant pain may be either an integral or the sole manifestation of a functional bowel order is already amply documented.5-11 The abundance of such patients habitually attending medical and surgical clinics who have eluded diagnosis implies that this is not common knowledge.

We have prospectively evaluated consecutive patients with chronic right upper quadrant pain referred to our department with particular reference to their gastrointestinal function, in its broadest sense, and their psychological state. Our hypothesis is that these patients are suffering from functional bowel pain akin to the irritable bowel syndrome and we have attempted to show this by balloon distention of the alimentary tract to reproduce their pain.

Methods

PATIENTS All patients referred to the department of gastroenterology between July 1983 and March 1984 because of chronic right upper quadrant pain were included in this study. There were 17 women and five men whose ages ranged from 25-64 years, median 39 years. These 22 patients comprised approximately 1.5% of all new patients referred to our department during this nine month period. They were not particularly sought out and we did not gain the impression that we saw more or less such patients during this period than during any other. The sources of referral of the 22 patients were
general practitioners (six), general surgeons (eight), general physicians (five), and gastroenterologists (three).

**Study Protocol**

All patients were initially assessed in the outpatient clinic. A detailed history and physical examination failed to reveal any local, musculoskeletal or neurological cause of their complaint. The notes and radiographs from other institutions (often voluminous) were then reviewed. None of our 22 patients had escaped previous investigations; liver function tests, full blood counts, barium studies or endoscopy and imaging investigations of the biliary tree had been carried out at least once on each patient and had been found essentially normal. In view of the nature of this study we felt it imperative to exclude a pancreaticobiliary tract or gastrointestinal tract lesion with complete certainty; thus if there was any doubt about normality in previous investigations, or if much time had elapsed since their performance, they were either repeated or a more discriminant investigation performed. In particular all patients had endoscopic retrograde cholangiopancreatograms. After review or repeat of the relevant tests had excluded organic abnormalities, each patient was admitted to the ward for clinical evaluation, assessment of depression and for balloon studies of the upper and lower gut. Depression was assessed at a semi-structured interview using a modification of the Hamilton rating scale. This included all 21 of the items originally devised by Hamilton with three extras: helplessness, hopelessness, and worthlessness.

**Balloon Studies: Upper Gut**

Patients were fasted for six hours before and during the course of these studies. The patient swallowed a weighted (20 g) latex balloon (London Rubber Industries) attached to two metres of 1.5 mm diameter radio opaque flexible tubing (Figure). The balloon reached the distal ileum within six to 18 hours. Under radiograph screening the balloon was inflated with air up to a maximum of 40 ml or less if severe pain was induced. Any symptom or pain experienced by the patient, its character, site and radiation was recorded. In particular patients were asked if they recognised typical spontaneous pain. On deflation of the balloon note was made of whether the pain was relieved and how quickly this occurred. If pain had been induced the balloon was deflated to check reproducibility. This procedure was repeated with the balloon sited in the proximal jejunum, the second part of the duodenum and the lower end of the oesophagus (Figure). The total radiograph screening time for each patient was less than two minutes.

**Balloon Studies: Colon**

Patients were prepared as for a normal colonoscopy. The procedure was done under light intravenous sedation (5 mg diazepam, 50 mg pethidine). An ordinary children’s rubber party balloon attached to 1.5 metres of fine polythene tubing was taped alongside the colonoscope (Figure). The colonoscope was introduced as far as the caecum. At this point the effect of the pethidine was reversed by intravenous Naloxone 0.4 mg. The balloon was inflated to a maximum of 250 ml, or less if severe pain was induced, and any pain, its site, radiation and character recorded as for the other balloon studies. As the colonoscope was withdrawn the balloon was reinflated at eight sites around the colon (Figure) and once again any pain recorded. At the beginning of the study, radiograph screening was used to verify the position of the balloon. It soon became clear that recognisable landmarks within the colon (caecum, flexures) and the ability to see the light through the abdominal wall usually made screening unnecessary.

**Results**

**Clinical Observations**

The patients were predominantly women in early middle age. Their symptoms had been present for
between two and 30 years (median nine years) and occurred in well-defined attacks in 14, but more continuously in eight. The pain often radiated to other sites, most frequently to the back at the level of the right hypochondrium (10) but also the right shoulder blade area (five), the epigastrium (four), and the right lower quadrant (three), of whose pain occurred in attacks, in only one did we consider this typical of true biliary colic. In the remainder the long duration of the pain, usually a day or more, and its quality made a diagnosis of biliary colic unlikely. Only two patients had not seen a hospital specialist before; the other 20 had previously seen a total of 76 consultants for their pain. All 22 had been previously investigated, in most cases exhaustively and repeatedly; of imaging studies alone, 72 pancreatobiliary procedures (oral cholecystogram, intravenous cholangiogram, ERCP, ultrasound, CT) 53 barium radiographs, 25 gastrointestinal endoscopies and 12 intravenous urograms had been undertaken. Understandably with so many investigations some abnormalities had been observed, though the passage of time had shown these abnormalities to be unrelated to the patients' symptoms. For instance, five patients had been found initially to have gall stones but the pain had continued unchanged despite cholecystectomy. Such pain though did not have the features of biliary colic, but was of the flatulent dyspeptic type. Similarly, several patients were found to have small ovarian cysts, retroverted uterus, gastritis, duodenitis, hiatus hernia and colonic diverticulosis but medical or surgical treatment for such abnormalities left the symptoms unaltered. It was noteworthy how often tests had been repeated despite complete normality on the first and subsequent occasions. Full blood count, ESR, and liver function tests were consistently normal in all patients. Sixteen patients had undergone 38 surgical operations in attempts to either cure or diagnose their pain. In none had this been successful in the long term. The operations most frequently performed had been cholecystectomy (10) and appendicectomy (12). The other 16 operations included ovarian cystectomy, ventral suspension of the uterus, exploratory laparotomy, nerve excision and sundry others. In only five of 10 cholecystectomies were gall stones or gall bladder disease found. All but one appendicectomies were carried out for 'grumbling appendicitis' and only in the one acute case was there histological evidence of inflammation.

**Balloon Studies**

Spontaneous right upper quadrant pain was exactly and reproducibly induced in 21 of the 22 patients by balloon distension of at least one area of the small or large intestine (Table). In 12, more than one trigger area was found to reproduce right upper quadrant pain and the areas were not necessarily in continuity — for example, jejunum and caecum. The areas most commonly shown to be sensitive were the jejunum (15), ileum (12) and right colon (nine); the duodenum (six) was less often sensitive. The distribution of trigger areas within the colon was caecum (eight), ascending (eight), hepatic flexure (six), transverse (three) and splenic flexure (one). In none of these 22 patients could spontaneous right upper quadrant pain be reproduced by balloon distension of the oesophagus or the left colon distal to the splenic flexure.

In about half of those patients in whom the spontaneous right upper quadrant pain typically radiated such radiation was also induced by balloon distension: to the back in five of 10, to the right shoulder blade in two of five, to the epigastrium in three of four and to the right lower quadrant in two of three.

As would be expected, all patients were aware of some pain or sensations during these procedures which were quite unlike their spontaneous pain, either in site or character. Most commonly these were a sensation of heartburn from the oesophagus, a sickening central ache from the small bowel, lower abdominal wind pains from the colon and a desire to defaecate with rectal distension. In addition, 15 patients experienced pain of the same character as their spontaneous pain though in an unaccustomed abdominal site. The trigger areas responsible for such pain were different from those which triggered the right upper quadrant pain. In particular, left sided colonic distension often caused left sided or lower abdominal pain of recognisable character.

**Assessment of Associated Symptoms**

In no patient had a diagnosis of a functional bowel
disorder been made before referral, though many
had prominent symptoms suggesting such a dis-
order. Paramount amongst these were fat in-
tolerance, flatulence and abdominal distension
which were specifically mentioned at the first interview by
18, 13, and 15 patients respectively. Other features
characteristic of a functional bowel disorder which
were revealed during the interview, though not
spontaneously volunteered, included irregular
bowel habit in 14, a frequent sensation of incom-
plete evacuation in 10, a change in stool pattern in
association with the pain in nine, relief of pain by
passing flatus or opening the bowels in 12, and
recognition of the pain being related to tension in
nine. On the basis of the history we considered 16 of
the 22 patients to be suffering from a typical
functional bowel disorder (though not classical
irritable colon syndrome).

Using the modified Hamilton rating scale, we
judged four patients to be severely, six moderately,
and four mildly depressed. Only eight were con-
dered free of depression. The eight patients with
continuous pain had more marked depression (four
severe, two moderate, two mild) than the 14 with
intermittent pain (four moderate, two mild). There
was no correlation between the presence or severity
of depression and age, duration of pain and func-
tional bowel complaints.

Discussion

This study has shown that distension of a part or
parts of the gut reproduces typical pain in patients
who suffer the syndrome of chronic right upper
quadrant pain with fat intolerance and flatulent
dyspepsia. The implication of this is that their gut is
oversensitive and that they have a functional bowel
disorder. This is analogous to the well recognised
observation that insufflation of air at sigmoidoscopy
will often reproduce the left lower abdominal pain
of patients with a spastic colon.

Balloon distension has been used to induce
alimentary tract pain since the beginning of the
century. Several physiological studies have shown
that the gut of normal individuals is sensitive to
distension and that the pain produced is referred in
well defined patterns. Distension of the cesophag-
gus is perceived retrosternally or in the epiga-
strium; of the stomach and small intestine in the
epigastrium or around the umbilicus; of the col-
on in the lower central or left abdomen and of the
rectosigmoid colon in the hypogastrium, left iliac fossa, or perineum. Fewer studies have
been published on pain referral from biliary tract
distension but where this has been done the pain
was referred predominantly to the epigastrium and
occasionally to the right upper quadrant. These data
are of course derived from normal subjects. It would
be incorrect to assume that the distribution of pain
referral from gut distension is the same in normal
subjects, those with organic diseases and those with
functional gut disorders.

There has, until recently, been little information
regarding sensitivity to, and pain referral from, gut
distension in functional disorders. Dworken repro-
duced functional symptoms of pain in the left upper
abdomen, arm and praecordium in 11 sufferers by
balloon distension of their splenic flexures. He
called this the splenic flexure syndrome. In similar
manner Ritchie found patients with classical irrit-
able colon syndrome very sensitive to balloon
distension of the sigmoid colon. Balloon inflation to
a degree not usually perceptible in a normal subject
produced the patients' typical lower left abdominal
pain.

More recently Swarbrick et al and Moriarty
et al have shown that functional pains in a variety
of abdominal and extra-abdominal sites could be re-
produced by balloon distension of the large or small
intestine or both. Harvey and Read have made the
same point but using a different technique. Rather
than distend the gut, they caused it to contract using
cholecystokinin and were able to mimic a typical
attack of irritable bowel pain. Levitt's group
showed the sensitivity of the gut to distension in
patients with functional abdominal pain by infusing
gas into the small intestine. This rarely caused
discomfort in normal controls but usually caused
severe and typical symptoms in the patients.

The failure to find a biliary tract disorder in our
patients is not surprising as chronic right upper
quadrant pain of this type, despite popular belief, is
not a feature of cholelithiasis or biliary colic. It has
been convincingly shown in a number of studies that
flatulent dyspepsia and fat intolerance are no more
common in those with, or those without, gall
stones. Where any abnormality can be shown in
patients with such symptoms it is a gut motility
disorder.

A report by Valberg of putative biliary pain in
the presence of an entirely normal biliary tract and
liver function is of some interest. The patients
described were all young women with chronic
intermittent right upper quadrant pain; the majority
also had typical symptoms of a functional gut
disorder and many had depression or anxiety. When
given cholecystokinin the symptoms of right upper
quadrant pain were reproduced and this was taken
by the authors as evidence of biliary pain. In the
light of more recent experience with cholecystoki-
nin, however, it seems highly probable that the
'biliary pain' of these women was in fact gut pain.
The history of extensive and fruitless investigations and operations in our patients is by no means unusual. Such observations are commonplace in most reviews of the irritable bowel syndrome. Similarly our finding of unrecognised depression is not original. Depression has been shown to be a common accompaniment to long standing irritable bowel syndrome or indeed other disorders manifest by chronic pain. It is unclear whether depression predisposes to intractable functional abdominal pain or vice versa but speculation on this chicken and egg dilemma is probably unrewarding. What seems clear from our observations is that the vicious circle will not be broken until the depression is treated.

The main concern is the medical time, effort and facilities wasted and the detrimental emotional effect on the patient. There is also, though, a financial consideration. On average each patient had 3-5 consultations, 7-3 investigations, 1-7 operations and more than 20 blood and urine tests. There is no reliable way to determine the cost of this to the Health Service but in the British private sector 2 to 3 thousand pounds per patient would be a realistic estimate.

We feel that an accurate history and its correct interpretation will prevent unnecessary investigations in this group of patients and enable them to be given appropriate rather than inappropriate management. There would seem to be a place for tests such as these in the patient who demands or requires further investigation when the clinical diagnosis is functional abdominal pain.

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References
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