Gallstones and flatulent dyspepsia: cause or coincidence?

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Summary

The pre-operative and postoperative incidence of flatulent dyspepsia was studied in 108 patients undergoing cholecystectomy. Ninety (83%) had pre-operative symptoms; of these forty-one (46%) were symptom-free after operation and twenty-two (24%) were improved but twenty-seven (30%) were no better. Patients with a well-functioning gallbladder, demonstrated radiologically, were relieved significantly more often than those with a poor or non-functioning gallbladder. Fatty food precipitated the symptoms in the majority of patients.

These figures suggest that there is neither a direct causal relationship between gallstones and flatulent dyspepsia nor is the relationship entirely coincidental. The implications of these findings for clinical practice are discussed.

Introduction

Although it is commonly taught that the typical patient with gallstones is a ‘fat, fair, flatulent, female’, the relationship between gallstones and flatulent dyspepsia is far from certain.

On the one hand it has been increasingly realized that cholecystectomy fails to relieve these symptoms in a proportion of patients so that Maingot (1956) could write that ‘cholecystectomy has little or no effect in curing the unpleasant symptoms of flatulent dyspepsia’. On the other hand similar symptoms occur frequently in patients with a normal gallbladder; in fact Price (1963) found that in women between 50 and 70 years there is an equal incidence of these symptoms in those with a normal and those with an abnormal cholecystogram.

The purpose of this study was to determine the pre-operative incidence of flatulent dyspepsia in patients with gallstones and the effect of cholecystectomy alone on these symptoms.

Definition of symptom-complex known as flatulent dyspepsia

This is a well-known symptom-complex but difficult to define accurately. It causes considerable discomfort but is clearly distinguishable from the pain of peptic ulceration. Rhind & Watson (1968) describe it as follows: ‘epigastric discomfort after meals, a feeling of fullness so that tight clothing is loosened. Eructation with temporary relief and regurgitation of sour fluid to the mouth with heartburn’. Hess (1965) described it as a sensation of fullness, slight nausea and tension especially after particular food and points out that the discomfort cannot be provoked by palpation.

In order to try to define it more exactly, it has been divided into nine individual symptoms as follows:

Flatulence

1. Repeated belching.
2. Full-feeling after normal-sized meal.
3. Inability to finish a normal-sized meal.
4. Abdomen becomes blown-out so that clothes have to be loosened.

Dyspepsia after meals

5. Burning discomfort in the epigastrium.
6. Burning discomfort in the chest (‘heartburn’).
7. Bitter fluid regurgitating into the mouth.
8. Vomiting (? bile).

Some belching is normal so it is only considered significant if accompanied by one or more of the other symptoms. Inability to finish a normal-sized meal implies that the patient is hungry but feels full-up soon after starting a meal and this must be distinguished from true anorexia. Heartburn is a symptom of oesophageal reflux and for this study it was only considered significant if accompanied by one or more of the other symptoms. Vomiting is not a common part of the syndrome. It was not considered significant in isolation but nausea and bloating may end in bilious vomiting.

It was decided on an arbitrary basis to consider a history of flatulent dyspepsia to be positive if two or more of the individual symptoms were regularly present up to the time of operation (provided they were not numbers 8 and 9 alone). As will be seen below, many patients complained of symptoms from both groups.

Patients are not as vague in describing their symptoms as is commonly imagined, but can often
give the exact time of onset after a meal, the progression of the symptoms and the type of aggravating food. The vagueness is frequently on the part of the clinician!

Subjects and methods

Selection of patients

Patients were only included in the survey if they fulfilled the following criteria:

There were proven gallstones and/or chronic cholecystitis at operation and subsequent histology.

There was no associated duodenal or gastric ulcer, pancreatitis or hiatus hernia shown at operation or on pre-operative barium studies. (A hiatus hernia was said to be present if the hiatus admitted over two fingers.) There was no pre-operative jaundice.

The common bile duct was normal on visualization and palpation, and/or radiologically normal, at operation. (Operative cholangiography was performed in 50% of the cases.)

Cholecystectomy alone was performed without exploration of the common bile duct, sphincterotomy or any other upper abdominal operation.

Method of follow-up

The study was prospective, by interview, in one third and retrospective by postal questionnaire in two thirds. A patient’s postoperative condition was classified as:

(a) Cured, when there were no symptoms and no food intolerance.

(b) Improved, when the symptoms were still present but less severe or the patient could only remain symptom-free by diet restriction.

(c) No better.

Questions were asked about the presence or absence of each of the above symptoms before and after operation and the patients were invited to say what type of food precipitated the symptoms. The descriptions of pre-operative symptoms were checked with the case notes.

Questions were also asked about postoperative jaundice to exclude obstruction due to a retained stone or cholangitis and the patient excluded from further consideration if this had been present.

The follow-up period was from 3 months to 3½ years: by 3 months the patients were back to work and their normal way of life and were eating their normal diet. This period is long enough for the symptoms to have subsided if the operation was effective but not so long that new gastrointestinal disease is likely to have developed since operation.

Assessment of gallbladder function

Gallbladder function was assessed by cholecystography during the pre-operative period in which symptoms were present, usually within 3 months of the operation. The function was classified into: Good or moderate; poor; or nil (even after ‘double dose’ cholecystography), on the basis of personal assessment of the films, together with a radiologist’s report. Although interpretation of the radiograph is inevitably rather subjective it is the best method available and Baker & Hodgson (1960) found that the accuracy when checked with operation findings was 98%.

Results

There were 108 patients, seventy-three females and thirty-five males, 103 having gallstones and five having chronic non-calculeous cholecystitis. The distribution of pre-operative and postoperative symptoms divided the patients into four groups (Table 1).

| Table 1. Distribution of pre-operative and postoperative symptoms (108 patients) |
|---------------------------------|-----------------|-----------------|
| Flatulent dyspepsia pre-operatively | 18 (17%) | 90 (83%) |
| Flatulent dyspepsia:             |                 |                |
| Pre-operatively                  | 27 (30%)       | 22 (24%)       |
| Postoperatively: No better       | 27 (30%)       | 22 (24%)       |
| Improved                         | 22 (24%)       | 41 (46%)       |
| Cured                            | 41 (46%)       |                |

Group I patients had no flatulent dyspepsia pre-operatively and developed none postoperatively.

Group II patients had pre-operative symptoms which were no better after operation; the symptoms of those in Group III were improved or they could only remain symptom-free by avoiding certain foods; while those in Group IV were cured by cholecystectomy. Table 2 shows the sex distribution, average age and average length of follow-up for each group. It will be seen that the groups are comparable in these respects. The female preponderance of the series as a whole is shown in all groups but is least in Group I and greatest in Group II. It is interesting to note that those in Group I who had no pre-operative symptoms, did not differ in other respects from the other patients.

Method of follow-up

It is debatable whether interview or postal follow-up gives the more accurate assessment. At interview, supplementary questions can be asked to clarify the situation but, on the other hand, the patient may be afraid to say what the symptoms are really like or her answers can be influenced by the way the question is asked. It is important to note that very few were operated on by the author. Postal questionnaires are likely to give a more honest assessment but can be ambiguous. Bodvall (1964) found no significant difference between the two methods, whereas Lund (1960) found that more patients admitted to symptoms on personal interview than with a questionnaire. Table 3 shows the groups subdivided by the
Gallstones and flatulent dyspepsia

Table 2. Sex distribution, average age and average length follow-up

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Males</th>
<th>Females</th>
<th>Average age (years)</th>
<th>Average follow-up (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I (No pre-op. symptoms)</td>
<td>18</td>
<td>8</td>
<td>10</td>
<td>52</td>
<td>13</td>
</tr>
<tr>
<td>Group II (No better)</td>
<td>27</td>
<td>5</td>
<td>22</td>
<td>49</td>
<td>16</td>
</tr>
<tr>
<td>Group III (Improved)</td>
<td>22</td>
<td>6</td>
<td>16</td>
<td>51</td>
<td>17</td>
</tr>
<tr>
<td>Group IV (Cured)</td>
<td>41</td>
<td>16</td>
<td>25</td>
<td>51</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 3. Groups sub-divided by method of follow-up

<table>
<thead>
<tr>
<th></th>
<th>Interview</th>
<th>Postal</th>
</tr>
</thead>
<tbody>
<tr>
<td>No flatulent dyspepsia pre-operatively</td>
<td>5 (14%)</td>
<td>13 (18%)</td>
</tr>
<tr>
<td>Flatulent dyspepsia pre-operatively</td>
<td>32 (86%)</td>
<td>58 (82%)</td>
</tr>
<tr>
<td>Of those with pre-operative symptoms:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-operatively: No better</td>
<td>9 (28%)</td>
<td>18 (31%)</td>
</tr>
<tr>
<td>Improved</td>
<td>9 (28%)</td>
<td>13 (22%)</td>
</tr>
<tr>
<td>Cured</td>
<td>14 (44%)</td>
<td>27 (47%)</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>71</td>
</tr>
</tbody>
</table>

method of follow-up and it will be seen that they are very similar.

Severity and type of symptom; food intolerance

The severity of symptoms was divided into severe, moderate and mild based on the number of symptoms present and the severity as stated by the patient. This is of course a very subjective measurement but it is assessed to ensure that all those with severe symptoms did not fall into the group that were not helped by operation. Table 4(a) gives the results and it will be seen that Groups II and IV are very similar but Group III had a higher proportion of those with severe symptoms.

Similarly the symptoms were divided into whether they were flatulent or dyspeptic, or both, according to the classification outlined above. Table 4(b) gives the results and it will be seen that the majority of patients had symptoms from both groups. Group III is interesting as the operation seemed to effect one group of symptoms or the other but not both.

The patients were invited to state the type of food that made their symptoms worse but were not given a list of foods to help their assessment. Fatty food was the most common by far but some patients gave more than one food. Table 5 gives an analysis of the sixty-seven patients who linked their symptoms with a particular type of food.

Length of history

The one question that was badly answered in the questionnaires was the length of time that the symptoms had been present, such expressions as 'for many years' being used, but in general Group II patients appeared to have a longer history than those of Groups III and IV. The significance of this for the present study is uncertain as it is of course impossible to determine how long the gallstones have been present.

Operative cholangiography

Although there was a slightly greater proportion

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group II (no better)</td>
<td>27</td>
<td>5</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Group III (improved)</td>
<td>22</td>
<td>1</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Group IV (cured)</td>
<td>41</td>
<td>8</td>
<td>31</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Both dyspepsia and flatulence</th>
<th>Flatulence only</th>
<th>Dyspepsia only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group II (no better)</td>
<td>27</td>
<td>17 (63%)</td>
<td>7 (26%)</td>
</tr>
<tr>
<td>Group III (improved)</td>
<td>22</td>
<td>22 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Before operation</td>
<td>22</td>
<td>11 (50%)</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>After operation</td>
<td>41</td>
<td>35 (86%)</td>
<td>2 (5%)</td>
</tr>
</tbody>
</table>
of patients cured or improved amongst those in whom operative cholangiography was performed, this difference was not statistically significant \((P>0.05)\), but suggests that in a few patients the persistent symptoms might be due to undetected pathology in the common bile duct or the sphincter of Oddi.

**Relationship of gallbladder function to persistent symptoms**

When the pre-operative gallbladder function was analysed, a highly significant difference between the groups emerged (Table 6). Those with good or moderate function were improved or cured more often than those with poor or nil function \((P<0.01)\). It should be noted that 71% of the patients with no pre-operative flatulent dyspepsia (Group I) had poor or non-functioning gallbladders. It is sometimes thought that the non-functioning gallbladder is responsible for these symptoms, but this seems unlikely.

These results can be summarized as follows:

(a) 83% of patients with isolated gallbladder disease had pre-operative flatulent dyspepsia.

(b) 17% of the patients had no such symptoms and did not develop any after operation. This group did not differ significantly in other respects from the rest of the patients in the series.

(c) Cholecystectomy made a significant difference to the symptoms, 70% of patients being cured or improved but 30% remained unchanged.

(d) This distribution correlated with pre-operative gallbladder function, good function promising a better result than poor function.

(e) The symptoms of flatulent dyspepsia are not the result of cholecystectomy but are present before operation.

**Discussion**

These results are similar to those of Rhind & Watson (1968) who found that 70% of such patients were cured or improved by operation. Goldsmith (1957) found that only twenty-three out of 114 patients \((20\%)\) were completely symptom-free, the remainder being generally improved. Bodvall (1964) found that one-third of his patients had postoperative flatulent dyspepsia. The term ‘postcholecystectomy syndrome’ is confusing as it implies that the symptoms are the result of operation, whereas in all cases in this series they were present beforehand. It also combines symptoms such as pain and diarrhoea that may be quite unrelated and Burnett & Shields (1958) and Glenn & Johnson (1955) have condemned its use.

Many theories have been suggested to explain persistent dyspepsia, including co-existent gastric and duodenal disease or disease of the biliary tract and pancreas; these have been excluded as far as possible in the present survey. It is possible that common duct stones or disease of the sphincter of Oddi unidentified at operation have been left behind in a few patients and the finding that results were slightly better when operative cholangiography was used might support this; but Havard (1960) found that this was proved in only 2% of those with recurrent or persistent symptoms who underwent cholecystectomy alone (without cholangiography). His patients were subsequently followed up and

### Table 5. Analysis of food intolerance

<table>
<thead>
<tr>
<th>Food</th>
<th>Before operation (sixty-seven patients)</th>
<th>After operation (thirty-eight patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatty and fried food, pastries and cream</td>
<td>60 ((90%))</td>
<td>23 ((61%))</td>
</tr>
<tr>
<td>Meat</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Eggs</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Cucumber and salads</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Vegetables</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Onions</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Stews</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Biscuits and sweet food</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Spiced food</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

### Table 6. Gallbladder function and the results of operation

<table>
<thead>
<tr>
<th>Gallbladder function</th>
<th>Nil or poor</th>
<th>Moderate or good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms no better</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Symptoms cured or improved</td>
<td>21</td>
<td>37</td>
</tr>
</tbody>
</table>

\((\chi^2=8.53; P<0.01)\)

(In eight patients there was no pre-operative cholecystogram.)
re-operated on because of symptoms which could possibly be attributed to retained common bile duct stones. This is most unlikely to account for the incidence of persistent symptoms reported here (Table 1).

Biliary dyskinesia (Mallet-Guy & Maillet, 1941) or inco-ordination of bile duct motility is a popular concept on the continent of Europe but has not gained acceptance in this country. It is used mainly to explain postoperative biliary colicky pain, rather than flatulent dyspepsia.

However, all these theories combined would not account for the high proportion (54%) with persistent flatulent dyspepsia found in this study. This is well summarized in an Annotation in the Lancet (1956): ‘None of those explanations or attempted cures has so far proved altogether acceptable... Neither are mistakes in the original diagnosis common at the root of late postoperative trouble... Even when the surgeon is led to re-explore in the hope of finding retained stones, he rarely finds them, and when he does their culpability often remains in doubt. The surgeon who expects to find one of the variety of abnormalities which may follow cholecystectomy, common, is doomed to bitter disappointment.’

Not all patients with gallbladder disease have flatulent dyspepsia and Hess (1965) gives the pre-operative incidence as 32% in those with calculous cholecystitis and 35% in those with non-calculus cholecystitis. Bodvall (1964) found a pre-operative incidence of 50% in a large series which included patients with common bile duct stones. The present survey shows a considerably higher incidence but flatulent dyspepsia was not necessarily the presenting symptom.

Price’s findings, quoted above, that an equal incidence of the symptoms occurred in those with a normal and those with an abnormal cholecystogram led him to the conclusion that the relationship with gallbladder disease is coincidental. It could, however, suggest a common abnormality in those with normal and abnormal gallbladders which could still be affected by operation. It is very difficult to explain the effect of cholecystectomy alone in curing 46% of the patients if there is no association at all.

Of particular interest is the finding that the removal of a functioning gallbladder with stones, more often relieved the symptoms than the removal of a non-functioning gallbladder. Bodvall (1964) found that the frequency of postoperative dyspepsia was not influenced by sex, age, or type of gallbladder disease. Eckdahl (1953) on the other hand, found a higher incidence of post-cholecystectomy ‘distress’ in patients with functioning gallbladders but the symptoms included biliary colic and diarrhoea and the incidence of pre-operative symptoms is not given; Goldsmith (1957) was unable to confirm this relationship.

The correlation of relief of symptoms with gall-bladder function, found in the present survey, suggests that the effect of gallbladder contraction may be significant and this is further borne out by the finding that pre-operative fat intolerance was more common in the patients with well-functioning gallbladders and most noticeable in the group which was cured by operation. It is not perhaps surprising that the removal of a non-functioning gallbladder has less effect, as the biliary physiology is not significantly altered. It would be interesting to see the effect of a different type of operation on these symptoms. There is probably a disordered physiological process common to all patients with these symptoms; in a proportion of patients these disorders are caused by the gallbladder disease and are, therefore, cured by cholecystectomy.

As pointed out by Rains (1964), these symptoms seem to refer to the stomach rather than the biliary apparatus. Ingested fat produces two well known effects on the gallbladder, stomach and duodenum:

1. Contraction of the gallbladder through cholecystokinin release.
2. Inhibition of gastric motility and secretion.

A duodenum distended with bile and an atonic stomach predispose to delayed gastric emptying and bile regurgitation (Capper et al., 1967), and this at present seems the most satisfactory explanation of the distribution of the symptoms. Some clinicians attribute flatulent dyspepsia to depression and psychoneurosis and there may be a link, as psychological stimuli have a profound effect on gastrointestinal motility.

Conclusions

The following conclusions may be drawn from this survey:

(a) Flatulent dyspepsia occurs in the majority of patients with gallstones but not in all.
(b) It is present before operation and is not the result of operation.
(c) Nearly half (46%) of the patients with gallstones are completely cured of their symptoms by cholecystectomy but nearly a third (30%) are no better.
(d) A functioning gallbladder appears to be an important factor in those that are relieved of their flatulent dyspepsia by operation for gallstones.

These results suggest that an association does exist between flatulent dyspepsia and gallbladder disease but that it is not a direct causal relationship, nor does it seem to be entirely coincidental.

The effect of these conclusions on clinical practice

These conclusions influence clinical practice in several ways:

1. Flatulent dyspepsia alone is not an adequate indication for cholecystectomy.
A patient, who asks, can be given an idea of the chances of being free of these symptoms and diet restrictions after operation.

If the symptoms do persist, and provided a thorough laparotomy and cholangiography have been performed, re-exploration is likely to be fruitless and may be hazardous.

The persistent symptoms may be treated by avoiding certain foods—especially fats, and by simple drugs, especially those affecting gastrointestinal motility (Johnson, 1971).

Acknowledgments

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References


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