

Clinical diagnosis of gall-bladder disease

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SUMMARY. An investigation into the diagnosis of gall-bladder disease in general practice by simple clinical methods was carried out over seven years; 916 patients were seen in 1018 episodes of illness. These patients were examined particularly for oedema in the skin and subcutaneous tissue of the right hypochondrium, Murphy's sign, clinical jaundice and bilirubinuria.

Oedema was found in 89% of the episodes of confirmed gall-bladder disease and in 74% of the suspected cases, but in only 4% of the other abdominal and thoracic conditions studied. Clinical jaundice or bilirubinuria or both occurred in 28% of the confirmed episodes of gall-bladder disease and in 12% of the suspected ones.

If oedema, Murphy's sign and jaundice were all present there was a 72% probability of the condition being gall-bladder disease.

During the study, there was a 45% increase in the number of new cases of gall-bladder disease correctly diagnosed each year compared with the previous three and a half years, and an 89% decrease in the number of cases missed.

Introduction

GALL-BLADDER disease can be regarded as a single disease complex consisting of acute cholecystitis, chronic cholecystitis and cholelithiasis.¹ Most of the articles on its clinical diagnosis have been written by surgeons, but there have been a number from general practice.²⁻¹⁵

In 1960 the author noticed that patients with acute cholecystitis had slight oedema in the tissue overlying the gall bladder in the right hypochondrium and also in the tissue of the adjacent right costal margin. This was first described in 1968⁵ and became known as Leake's oedema test.¹⁶ In 1973 it was discovered that in 1743 Jean Louis Petit¹⁷ had observed oedema in the overlying tissue when an abscess of the liver had formed in the right hypochondrium. From his description it seems likely that this 'abscess' was acute suppurative cholecystitis.

This study aimed to show how oedema occurs commonly in gall-bladder disease but only rarely in related abdominal and thoracic conditions, making this sign useful in the differential diagnosis of the acute abdomen and of jaundice.

Method

This study was conducted for a period of six years and eight months. The practice was in Bradford, West Yorkshire, and contained 2607 patients at the beginning of the survey and 2741 at the end. The age and sex distribution of the practice was similar to that of the United Kingdom as a whole during the same period.

A total of 915 patients aged 14 years or over who had any of the following conditions were identified:

1. Gall-bladder disease which had been confirmed by cholecystography or laparotomy or both.
2. Suspected gall-bladder disease which had been investigated but had not been confirmed.

3. One of the 17 abdominal or thoracic conditions in the differential diagnosis of gall-bladder disease, as listed in Table 1.
4. Hepatitis.
5. Primary or secondary carcinoma in or around the liver.

For each of the 1018 episodes of the above conditions (during an episode of illness there may have been a number of consultations) the presence or absence of the following signs was noted:

Oedema — skinfolds on the right costal margin and in the right hypochondrium were compared with the corresponding areas on the left to detect oedema if it was present. This involved pinching the skin between the index finger and thumb in four different places at each examination. During the last three years of the study, the Ponderax skinfold calipers¹⁸ were used to measure the oedema after the digital examination and the results were compared.

Murphy's sign¹⁹

Clinical jaundice

Bilirubinuria — urine bilirubin levels were measured by the Ictotest.²⁰

Cholecystograms were arranged directly with the radiology departments of the local hospital, but ultrasound examinations were not requested as they were not in common use at the time of the study.

Results

Method of detection of oedema

During the whole study period about 9800 digital estimations of oedema were made. In the last three years of the study the effectiveness of this method was determined by comparing the results of digital examination with those of the Ponderax skinfold calipers. On each patient four digital estimations and four caliper measurements were made. Out of a total of 896 comparisons the methods disagreed on only 20 occasions, suggesting that the digital method is sufficient for assessing oedema.

Comparison of physical signs

Out of the 1018 separate active episodes of illness there were 81 episodes of gall-bladder disease which were either already proven or which were later confirmed, 77 episodes which were suspected but never confirmed and 860 other abdominal and thoracic conditions, including hepatitis and carcinoma (Table 1).

Of the 81 episodes of confirmed gall-bladder disease, jaundice (defined as clinical jaundice or bilirubinuria or both) was present in 23 episodes (28%) and Murphy's sign was present in 44 episodes (54%) (Table 1). Oedema, however, was seen in 72 of the 81 episodes of confirmed gall-bladder disease (89%) and in 57 of the 77 episodes of suspected gall-bladder disease (74%), but in only 36 out of 860 episodes of the other conditions (4%). If carcinoma was excluded the only other condition in which oedema was observed together with Murphy's sign and jaundice was viral hepatitis and then in only 8% of episodes (two out of 26).

Oedema of the skin of the hypochondrium was also noticed after right radical mastectomy in all five cases seen, and lateral to a laparotomy incision in the right upper abdomen in 34 out of 63 cases. Patients in these two groups were excluded from the comparison of the physical signs.

Table 1. Comparison of the physical signs for patients with confirmed or suspected gall-bladder disease, hepatitis, abdominal carcinoma or one of 17 related abdominal and thoracic conditions. (Percentages of total episodes are given in parentheses.)

	Number of episodes			
	Total	Oedema present	Murphy's sign present	Jaundice present ^a
Total of confirmed gall-bladder disease	81	72 (89)	44 (54)	23 (28)
Suspected gall-bladder disease	77	57 (74)	41 (53)	9 (12)
Other abdominal and thoracic conditions				
Hiatus hernia	16	1	—	—
Oesophagitis	37	3	1	—
Acute pancreatitis	1	—	1	1
Gastric ulcer	29	—	—	—
Duodenal ulcer	77	2	3	—
Perforated peptic ulcer	7	—	7	—
Acute gastritis	150	4	2	—
Acute gastroenteritis	161	5	5	—
Acute appendicitis	75	—	—	—
Acute intestinal obstruction	17	—	—	—
Right pyelonephritis	60	—	—	—
Right renal colic	8	1	—	—
Right pulmonary infarction	4	—	—	—
Right pneumonia	34	1	1	—
Right pleurisy	35	1	3	—
Epidemic pleurodynia (Bornholm)	12	—	—	—
Myocardial infarction	85	4	—	—
Viral hepatitis	26	2 (8)	4 (15)	26 (100)
Drug-induced hepatitis	1	—	—	1
Carcinoma in or around the liver	25	12 (48)	3 (12)	3 (12)
Total of suspected gall-bladder disease and related conditions	937	93 (10)	71 (8)	40 (4)

^a Jaundice was defined as clinical jaundice or bilirubinuria or both.

Predictive values for gall-bladder disease

For the episodes detailed on Table 1, the sensitivity, specificity and predictive values of the signs were calculated (Table 2). An abnormal cholecystogram or a pathological gall-bladder at laparotomy or both were used as reference tests, and oedema, Murphy's sign and jaundice as screening tests. The predictive value of positive results for gall-bladder disease based only on the combination of the presence of oedema, Murphy's sign and jaundice was 72%.

Overall, the increase in the new confirmed cases of gall-bladder disease diagnosed by the author during the study compared with the previous three and a half years was 45%, from an average of 3.1 to 4.5 cases per year. Similarly, there was an 89% decrease in the number of new cases missed by the author but correctly diagnosed later by another doctor, decreasing from an average of 1.7 to 0.9 per year.

Discussion

Oedema of the wall of an acutely inflamed gall-bladder has been described by many authors.¹⁹⁻²⁵ It may persist for weeks.²⁶ In acute cholecystitis the inflammation can spread from the surface of the gall bladder to the overlying parietal peritoneum.²⁷ The oedema observed in acute episodes of gall-bladder disease is probably due to inflammation of the anterior abdominal wall in the same way that acute sinusitis produces facial oedema. Blockage of the lymphatic system is the likely cause of the oedema seen after mastectomy or laparotomy and in patients with carcinomas in the region of the gall bladder.

In this study oedema was seen in 89% of the episodes of confirmed gall-bladder disease and in 74% of the episodes of suspected gall-bladder disease, but in only 4% of the other abdominal and thoracic conditions studied, suggesting that it is a useful sign in the diagnosis of gall-bladder disease.

The predictive value of positive results for gall-bladder disease based only on the combination of the presence of oedema, Murphy's sign and jaundice was 72%. In a study of computer differential diagnosis of the acute abdomen based on a detailed history and clinical examination, the predictions for acute

Table 2. Sensitivity, specificity and predictive values of both positive and negative results in 81 episodes of confirmed gall-bladder disease in 54 patients compared with 937 episodes in 862 patients with suspected gall-bladder disease, related abdominal and thoracic conditions, hepatitis and abdominal carcinoma.

Screening test (physical signs considered)	Result	Reference test (cholecystogram or laparotomy or both)		Total (n = 1018)	Sensitivity (%)	Specificity (%)	Predictive value	
		Positive (n = 81)	Negative or not done (n = 937)				Positive (%)	Negative (%)
							TP TP + FN	TN FP + TN
Jaundice	Present	(TP) 23	(FP) 40	63	28	96	37	94
	Absent	(FN) 58	(TN) 897	955				
Murphy's sign	Present	44	71	115	54	92	38	96
	Absent	37	866	903				
Oedema	Present	72	93	165	89	90	44	99
	Absent	9	844	853				
Both oedema and Murphy's sign	Present	42	40	82	52	96	51	96
	Absent	39	897	936				
Both Murphy's sign and jaundice	Present	21	13	34	26	99	62	94
	Absent	60	924	984				
Both oedema and jaundice	Present	23	14	37	28	99	62	94
	Absent	58	923	981				
Combination of oedema, Murphy's sign and jaundice	Present	21	8	29	26	99	72	94
	Absent	60	929	989				

TP = true positive, FP = false positive, FN = false negative, TN = true negative.

cholecystitis were a little better — 80% accuracy²⁸ — but these hospital cases were probably more severe.

In acute episodes of gall-bladder disease in general practice jaundice is not common; it was found in 5% in one series¹ and in 13% in another.⁷ In a third practice of 5200 patients only five cases of jaundice were seen in five years.¹⁹ Out of a combined total of 2337 confirmed cases seen in hospitals there had been jaundice in only 12%.²⁹⁻³⁶

In this study, clinical jaundice or bilirubinuria or both occurred in 28% of the episodes in the cases of confirmed gall-bladder disease and a similar high level of 12% was seen in the suspected cases. This higher incidence of jaundice was probably related to testing the urine routinely with Ictotest tablets whether clinical jaundice was present or not. Transient bilirubinuria may be the only sign of biliary obstruction in gall-bladder disease in the same way that it often is in viral hepatitis.

In general practice there are four common causes of obstructive jaundice — gall-bladder disease, carcinoma, viral hepatitis and drug-induced hepatitis. Diagnosis is much easier now with specific tests for viral hepatitis and the increased accuracy of ultrasound,³⁷ but even after investigation there may still be doubt.³⁸ The oedema sign can offer immediate help. Oedema was seen in all the jaundiced cases of confirmed and suspected gall-bladder disease, and of carcinoma but was present in only 8% of those with viral hepatitis.

The outcome of the study was that more new cases of gall-bladder disease were correctly diagnosed each year than previously and less cases were missed. This may have been due to greater experience in diagnosis but was more likely a result of the routine use of the tests for oedema, Murphy's sign and bilirubinuria.

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Milk fat and gastrointestinal illness

The population of a paediatric practice was followed prospectively and determinants of acute gastrointestinal illness were evaluated in a nested age-matched case-control study. Children over one year of age taking low fat milk as their only milk source in the three weeks prior to illness had five times the risk of a doctor's visit for acute gastrointestinal illness as did children taking only whole milk during the same time period. This increased risk could not be explained by numerous potentially confounding variables or potential biases. There was no indication that the increased risk differed for rotavirus positive or rotavirus negative illness, or that it varied by children's age.

Source: Koopman JS, Turkisk J, Monto AS, et al. Milk fat and gastrointestinal illness. *Am J Public Health* 1984; 74: 1371-1373.