Usefulness of History-taking in Non-specific Abdominal Pain: A Prospective Study of 1333 Patients with Acute Abdominal Pain in Finland

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Abstract. *Background: Nonspecific abdominal pain is the commonest cause of a patient presenting to a doctor with abdominal pain of less than one week's duration. The differential diagnosis of NSAP is not always easy due to many similarities in the clinical presentation at onset and many cases may be misdiagnosed in the initial situation. To the Authors' knowledge, the diagnostic accuracy of history-taking is rarely considered in NSAP, and therefore the aim of the present study was to investigate the contribution of history-taking to correctly diagnosing NSAP in the clinical situation. Patients and Methods: The accuracy of clinical diagnosis of NSAP was studied in connection with the survey of acute abdominal pain by the Research Committee of the World Organization of Gastroenterology (OMGE). In an extension of the OMGE acute abdominal pain study, 1333 patients presenting with acute abdominal pain were included in the study. The clinical symptoms of each patient were recorded in detail, using a predefined structured data collection sheet, and the collected data were compared with the final diagnosis of the patients. Results: The most significant symptoms of NSAP in univariate analysis were: vomiting (Usefulness Index, UI=0.11, Risk Ratio, RR=2.01), progression of pain (UI=0.10, RR=1.90), location of pain at diagnosis (UI=0.05, RR=1.75), intensity of pain (UI=0.05, RR=1.57) and previous indigestion (UI=0.05, RR=1.44). The sensitivity of the doctors' initial decision in detecting NSAP was 0.70, with a specificity of 0.83 and an efficiency of 0.77. Conclusion: The results of this study do not support a specific link between any one clinical symptom and NSAP diagnosis. However, patients with midline pain, without any increase in pain and without vomiting, and those with weak or moderate pain tended to be at risk for NSAP.*

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The differential diagnosis of abdominal pain depends on optimal clinical assessment. There is no substitute for skill in interviewing patients and eliciting physical signs. Most diagnoses and their appropriate treatment are often obvious and highly probable on the basis of a careful medical history and clinical examination. In Finland, acute abdominal pain has been studied in connection with the survey of acute abdominal pain by the Research Committee of the World Organization of Gastroenterology (OMGE) (1). In earlier reports, we described the high accuracy of history-taking in the clinical diagnosis of acute appendicitis (AA), acute cholecystitis, acute small bowel obstruction and acute renal colic (2-11). Nonspecific abdominal pain (NSAP) is the commonest cause of a patient presenting to a doctor with abdominal pain of less than one week's duration. The differential diagnosis of the NSAP is not always easy due to many similarities in the clinical presentation at onset and many cases may be misdiagnosed in the initial situation. To the Authors' knowledge, the diagnostic accuracy of history-taking is rarely considered in NSAP, and therefore the aim of the present study was to investigate the contributions of history-taking to correctly diagnosing NSAP in the clinical situation.

Patients and Methods

The present prospective cohort of 1333 patients was admitted to the University Hospital of Tampere (n=545) between July 1978 and June 1981 and Savonlinna Central Hospital (n=788) between September 1981 and June 1984 suffering from acute abdominal pain less than 7 days duration. Also patients who were examined clinically by general practitioners and who were transferred to the study hospitals were included in this study.

Criteria for inclusion in this study and the diagnostic criteria were those set out by the World Organisation of Gastro-Enterology Research Committee (1, 2). There were 636 males (47.7%) and 697 females (52.3%) with a mean age (±SD) of 38.0±22.1 years. The clinical findings in each patient were recorded in detail (Table I), using a predefined structured data collection sheet (1, 2). In practice, the structured data sheets were collected by the surgeon in charge, although the same surgeon was responsible for the study and data collection. The disease history was recorded and categorised as shown in Table I.

Table I. *The clinical history of the patients with acute abdominal pain.*

1.	Age
2.	Gender
3.	Location of initial pain*: Upper midline, central midline or lower midline quadrants of abdomen (+)
	vs. other quadrants of the abdomen (–) (OMGE)
4.	Location of pain at diagnosis: Upper midline, central midline or lower midline quadrants of abdomen (+)
	vs. other quadrants of abdomen (–) (OMGE)
5.	Duration of pain: Duration of pain at diagnosis ≤12 hours (+) *vs*. >12 hours (–)
6.	Intensity of abdominal pain: Subjectively weak/moderate pain (+) *vs*. intolerable pain (–)
7.	Progression of pain from onset to diagnosis: Subjectively weaker/same pain (+) *vs*. worser than at the onset of pain (–)
8.	Type of pain: Subjectively steady pain (+) *vs*. colicky or intermittent pain (–)
9.	Aggravating factors: No aggravating factors (+) *vs*. movement, coughing, respiration, food or other (–)
10.	Relieving factors: No relieving factors (+) *vs*. vomiting, lying still, food, antacids or no relieving factors (–)
11.	Previous similar pain: yes (+) *vs*. no (–)
12.	Vertigo: no (+) *vs*. yes (–)
13.	Nausea: yes (+) *vs*. no (–)
14.	Vomiting: no (+) *vs*. yes (–)
15.	Appetite: normal appetite (+) *vs*. no appetite (–)
16.	Previous indigestion: no (+) *vs*. yes (–)
17.	Jaundice: no (+) *vs*. yes (–)
18.	Bowels: normal (+) *vs*. constipation, diarrhea, blood, mucus, white or normal stools (–)
19.	Micturition: normal (+) *vs*. abnormal (–)
20.	Drugs for abdominal pain: no (+) *vs*. yes (–)
21.	Previous abdominal surgery: no (+) *vs*. yes (–)
22.	Previous abdominal diseases: yes (+) *vs*. no (–)
23.	Use of alcohol: no (+) *vs*. yes (–)

*The clinical symptoms were graded positive (+=NSAP) or negative (–=other diagnosis).

The examination of the clinical symptoms were conducted using a standard technique and the results were graded positive or negative (Table I). The diagnosis of acute abdominal pain was done by considering all symptoms, signs and the results of laboratory tests together and the diagnostic criteria are defined elsewhere (OMGE)(1, 2). The sensitivity, specificity, efficiency, likelihood ratios (LR) and predictive values (PV) and usefulness index (UI) of the diagnostic methods were calculated (12-15).The use-fulness index (UI) is defined as d × (d-r), where d is the incidence of the finding in the disease (=sensitivity) and r is the incidence of the finding in a reference population (1-specificity). It runs coherently from -1 to 1 and tests where the UI is over 0.35 are regarded as useful (15).

Sensitivity=Tp/Tp+Fn
Specificity=Tn/Tn+Fp
Efficiency=Tp+Tn/Tp+Tn+Fp+Fn
LR+=sensitivity/1-specificity
LR–= sensitivity/specificity
PV+=Tp/Tp+Fp
PV–=Tn/Fn+Tn

Tp=positive diagnosis
Tn=true negative diagnosis
Fp=false positive diagnosis
Fn=False negative diagnosis

The likelihood ratio of a positive test result (LR+) tells how many times greater the probability of a positive test result is among patients with NSAP than in subjects without NSAP. LR+ should always be larger than 1 and LR+ of a good test (diagnostic method) is 10 or larger. The likelihood ratio of a negative test result (LR–) is the probability of a negative test result among patients with NSAP divided by the corresponding probability for subjects without NSAP. LR-should be less than 1 and the LR– ratio of a good test is less than 0.1.

Efficiency is a measure of the potential discriminating effect of a test prior to the results of the test being known and because the efficiency is dependent of the prevalence of disease, the estimated efficiency of the test can only be extrapolated to other populations with a similar prevalence of disease.

The positive predictive value (PV+) of the test is the probability that a patient has the disease (NSAP), when the test result is positive. The negative predictive value (PV–) of the test is the probability that a patient has not the disease (NSAP), when the test result is negative.

Results

The present study is based on the clinical presentation of 1333 patients with acute abdominal pain (Table II). 552 patients were initially considered (at hospital out-patient unit) to have an NSAP and 434/552 (78.6%) had a correct final diagnosis of NSAP. The distribution of the final diagnoses of the 552 patients considered to have NSAP at the primary clinical decision is shown in Table III. Acute appendicitis (n=16), acute cholecystitis (n=19) and dyspepsia (n=24) were the most common false positive diagnoses at the doctors initial decision (Table III). In addition, 184 patients having NSAP were missed at the initial diagnosis and they were later diagnosed. So, the total number of patients having NSAP was 618 (351 females and 267 males). Sensitivity, specificity, efficiency, LR+, LR–, PV+ and PV– values of the various clinical symptoms and doctors' initial decision in

Table II. *The distribution of diagnoses in patients with acute abdominal pain according to initial decision.*

Disease category	No. of patients	%
Non-specific		
Abdominal Pain (1)*	552	41.4
Acute appendicitis (2)	402	30.2
Acute cholecystitis (3)	135	10.1
Small bowel obstruction (4)	57	4.3
Dyspepsia (5)	27	2.0
Renal colic (6)	59	4.4
Diverticular disease (7)	13	1.0
Mesenteric lympadenitis (8)	9	0.7
Acute pancreatitis (9)	29	2.2
Perf. peptic ulcer (10)	6	0.5
Urinary tract infection (11)	10	0.8
Acute gynae. disease (12)	12	0.9
Miscellaneous (13)	22	1.7
Total	1333	100.0

*OMGE Rank order number in parenthesis.

Table III. *The distribution of the final diagnoses of 552 patients with acute abdominal pain considered to have the NSAP at the doctors initial decision.*

Disease category	No. of patients	%
Non-specific		
Abdominal Pain (1)*	434	78.6
Acute appendicitis (2)	16	2.9
Acute cholecystitis (3)	19	3.4
Small bowel obstruction (4)	10	1.8
Dyspepsia (5)	24	4.3
Renal colic (6)	6	1.1
Diverticular disease (7)	6	1.1
Mesenteric lympadenitis (8)	2	0.4
Acute pancreatitis (9)	5	0.9
Perf. peptic ulcer (10)	2	0.4
Urinary tract infection (11)	9	1.6
Acute gynae. disease (12)	5	0.9
Miscellaneous (13)	14	2.5
Total	552	100.0

*OMGE Rank order number in parenthesis.

detecting NSAP are summarised in Table IV. It is of interest to compare the relative "usefulness" of the doctors initial decision and clinical symptoms, and Table V shows the variables with usefulness index (UI) greater than 0.05.

Vomiting is possible in the patients with NSAP, but in most patients with the diagnosis of NSAP there is no vomiting and the vomiting variable had the highest diagnostic efficiency with UI of 0.11 and RR of 2.01. Location of pain is usually classified to be at midline in NSAP and in our study the diagnostic efficiency of 'location of pain at diagnosis' variable was 0.58 with 1.75 odds ratio and with an UI of 0.05 (Table V). The progression of acute abdominal pain was classified to be same or decreasing in most of the patients with NSAP and the diagnostic efficiency of progression of pain variable was 0.55 with 1.90 odds ratio (Table V). Although, the diagnostic efficiency of 'the intensity of the pain' variable was only 0.51, the UI was 0.05 with odds ratio of 1.57.

The sensitivity of the doctors' initial decision in detecting NSAP was 0.70 with a specificity of 0.83 and an efficiency of 0.77 (UI=0.37, RR=11.4). The most significant predictors of NSAP in univariate analysis were: vomiting (UI=0.11, RR=2.01), progression of pain (UI=0.10, RR=1.90), location of pain at diagnosis (UI=0.05, RR=1.75), intensity of pain (UI=0.05, RR=1.57) and previous indigestion (UI=0.05, RR=1.44).

Discussion

Our framework for the clinical interview and history-taking of the patients with acute abdominal pain is of course not absolutely comprehensive; however, our form used in this study is a list of questions most frequently asked by several doctors around the world. A detailed attention is paid in turn to 3 aspects; the pain, the gastrointestinal symptoms and the past medical history including previous operations and drugs being taken.

In order to express the site of pain only in few words, we should choose between one several carefully defined alternatives. The acute abdominal pain may not have absolutely precise location, but by choosing between well-defined alternatives a doctor can get as close as possible to the realistic situation. The optimal way to describe the site of pain is; (a) to ask the patient to indicate where the pain is situated and/or (b) to draw a small diagram. A useful way to get at the precise site of pain is to ask the patient with acute abdominal pain take one finger and place it on the exact spot. This procedure will work in localised pain, but in diffuse pain the patient may open the hand and rub the hand vaguely over the affected area. After locating precisely where the pain is at present, you should ask whether the pain has always been in the same place and if the pain has moved, ask precisely where it was at the start of the illness.

In patients with acute abdominal pain the aggravating factors with particular interest are movement, coughing and breathing. Movement means not jumping or running, but doctor should ask patient to move in bed by turning over or by sitting up. If coughing and deep breathing causes the patient to complain of pain, the symptom is positive or present. The previous remarks apply also to relieving factors, which make the pain better or decrease the pain in patients with acute abdominal pain. Doctor should also ask the aggravating or relieving effect of food, lying still, vomiting and any drugs in use.

Table IV. *Sensitivity, specificity, efficiency, LR+, LR–, PV+ and PV– of different symptoms and doctors initial decision in detecting NSAP. The positive results are in parenthesis.*

Symptom	Sens	Spec	Effic	LR+	LR–	PV+	PV–
Location of initial pain (midline *vs.* other)	0.56	0.49	0.52	1.10	0.90	0.48	0.56
Location of pain at diagnosis (midline *vs.* other)	0.42	0.71	0.58	1.43	0.82	0.55	0.59
Duration of pain (≤12h)	0.35	0.66	0.52	1.04	0.98	0.47	0.55
Intensity of pain (weak/moderate)	0.87	0.19	0.51	1.07	0.68	0.48	0.64
Progression of pain (same/weaker pain)	0.78	0.35	0.55	1.20	0.63	0.51	0.65
Type of pain (steady pain)	0.51	0.42	0.46	0.88	1.17	0.43	0.50
Aggravating factors (none)	0.79	0.58	1.57	0.85	0.57	0.58	0.33
Relieving factors (none)	0.38	0.72	0.56	1.36	0.86	0.54	0.58
Previous similar pain (yes)	0.35	0.67	0.52	1.06	0.97	0.47	0.54
Vertigo (no)	0.96	0.02	0.46	0.98	2.00	0.46	0.43
Nausea (yes)	0.53	0.39	0.45	0.87	0.77	0.43	0.49
Vomiting (no)	0.66	0.51	0.58	1.35	0.67	0.53	0.63
Appetite (normal)	0.34	0.79	0.58	1.62	0.53	0.58	0.58
Previous indigestion (no)	0.82	0.24	0.51	1.08	0.75	0.48	0.61
Jaundice (no)	0.99	0.04	0.48	1.03	0.25	0.47	0.85
Bowels (normal)	0.77	0.25	0.49	1.03	0.92	0.47	0.55
Micturition (normal)	0.95	0.07	0.48	1.02	0.71	0.47	0.62
Drugs for abdominal pain (no)	0.96	0.04	0.46	0.99	1.01	0.46	0.54
Previous abdominal surgery (no)	0.91	0.22	0.43	1.17	0.41	0.34	0.86
Previous abdominal diseases (no)	0.84	0.19	0.49	1.04	0.84	0.47	0.58
Use of alcohol (no)	0.95	0.05	0.46	0.99	1.14	0.46	0.51
Doctors initial decision	0.70	0.83	0.77	4.12	0.36	0.79	0.76

Acute abdominal pain is usually classified to be weak or moderate in NSAP. Only few of patients with NSAP the acute abdominal pain was severe making the patient shiver, sweat, roll about and cry out. However, the diagnostic efficiency of 'the intensity of the pain' variable was only 0.51, when the efficiency of the flipping of the coin is 0.50. The acute abdominal pain often varies in intensity quite spontaneously, but doctor should note the variation if the pain is clearly the same or decreasing/ increasing over a period of at least an hour or two. Acute abdominal pain was classified to be same or decreasing in 78% of patients with NSAP and the diagnostic efficiency of progression of pain variable was 0.55, however.

If the patient with acute abdominal pain has had a poor appetite for 5 years, but there has been no change in appetite during this episode of acute abdominal pain, the appetite is classified as normal in our study. Therefore the recent change in the patients' appetite is a history you are looking for.

In patients with acute abdominal pain the nausea and vomiting variables should be asked separately, although they are usually regarded as relatively well-defined symptoms. Every doctor knows that nausea without vomiting is possible, but some junior clinicians fail to learn that a patient can vomit without nausea, and especially this applies to children and adolescents with acute abdominal pain.

The past medical history of patients with acute abdominal pain is important because it may affect your decision about

Table V. *The doctors initial decision and the clinical symptoms with usefulness index (UI) greater than 0.05 and odds ratios (RR) in patients with NSAP.*

Symptom	UI	RR
Doctors initial decision	0.37	11.4
Vomiting (no)	0.11	2.01
Progression of pain (same/weaker pain)	0.101	1.90
Location of pain at diagnosis (midline *vs.* other)	0.053	1.75
Intensity of pain (weak/moderate)	0.052	1.57
Previous indigestion (no)	0.05	1.44

treatment. 'Previous pain'-variable means similar episodes of acute abdominal pain at some point previously. If possible, find out where and when any previous abdominal operation was performed and the reason for previous surgery and whether any problems occurred during or after operation. History-taking of a patient with acute abdominal pain is not complete without enquiry about drugs.

In summary, the results of this study do not support a specific link between one clinical symptom and NSAP diagnosis. However, the patients with midline pain, the patients without any increase in pain and the patients with weak or moderate pain tended to be at risk for NSAP.

Acknowledgements

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