

ORIGINAL ARTICLES

Acute Abdomen as a Cause of Death in Sudden, Unexpected Deaths in the Elderly

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ABSTRACT

Aims

This study profiles patients aged 70 years or above dying suddenly of an 'acute abdomen' and investigates the specific features associated with the conditions and their diagnoses.

Methods

A retrospective study using data obtained from autopsy and police reports held in the Forensic Medicine Section of the University of Edinburgh.

Results

From 1997 to 2000, out of 2121 autopsies of patients aged 70 or above, an 'acute abdomen' was considered as a primary cause of death in 111 cases. The number of cases increased over the period of study. Peptic ulcer disease was the commonest underlying cause of death. Twenty-nine (26.1%) cases were due to its complications, namely gastrointestinal haemorrhage and perforation. Sixty-nine (62.2%) patients were seen by a medical practitioner in circumstances arising from the onset of acute abdomen. In 27 (39.1%) cases a provisional diagnosis was recorded.

Conclusion

The 'acute abdomen' is still an appreciably frequent cause of death in sudden, unexpected deaths in the older age group. Some of the deaths may have been preventable with an early diagnosis. A high level of vigilance and early attention to an 'acute abdomen' by medical practitioners is therefore advocated.

Introduction

Acute abdominal pain is a common presenting complaint to the casualty department. In publications on three series of patients suffering from acute abdominal conditions, elderly people accounted for a significant proportion of such patients.^{1,2,3} In the UK series, which included over 16,000 patients of all ages, the mortality escalated sharply with age: in patients younger than 60 years, the mortality was never higher than 1%; in contrast, the figure rose to 7% in patients aged 80 years and over.³ In addition, the diagnostic accuracy on admission to hospital declined with increasing age: in patients aged 80 years or above, the initial diagnostic accuracy was only 29% compared to over 40% in younger patients.³

Studies of the acute abdomen in the aged have been carried out, which were mainly of patients presenting with acute abdominal complaints^{4,5,6,7,8} or of patients admitted for emergency abdominal surgery.^{9,10,11,12} However the 'acute abdomen' presenting as sudden, unexpected death was not a topic on which publication has appeared.

This study profiles patients aged 70 years or above dying suddenly of an 'acute abdomen' and investigates the specific features associated with the conditions and their diagnoses.

Methods

For the purpose of this study, an 'acute abdomen' is defined as a condition caused by an underlying intra-abdominal pathology, which would typically present with acute onset of abdominal pain and may be associated with features of peritonism on clinical examination. Ruptured abdominal aortic aneurysm was excluded from this study because the number of deaths would dominate the analysis.

The study was based on the post-mortem data relating to cases referred to the Forensic Medicine Section (FMS) by Procurators Fiscal as part of their common-law duty to investigate all sudden and unexpected deaths in the Lothian and Borders regions of Scotland.

Autopsy reports of patients aged 70 years or above, from 1997 to 2000 were screened for all cases in which a condition associated with 'acute abdomen' was noted as a primary cause of death on the death certificate. The autopsy reports and the police (sudden death inquiry) reports of the identified cases were further reviewed. The police reports are based on an investigation conducted by a specially trained police officer, including an interview of the deceased's general practitioner (GP) and contain a summary of all potentially relevant medical history of the deceased and to outline the circumstances surrounding their death.

Results

During the four-year period from 1997 to 2000, a total of 2121 autopsies of patients aged 70 or above were carried out by forensic pathologists at the FMS of the University of Edinburgh acting on the instructions of Procurators Fiscal in Lothian and Borders. They comprised 1069 (50.4%) males and 1052 (49.6%) females.

'Acute abdomen' as a primary cause of sudden, unexpected deaths

There were 111 cases in which an 'acute abdomen' was certified as the primary cause of death, consisting of 47 (42.3%) male and 64 (57.7%) female. The number of cases increased over the period of study (Figure 1).

Figure 1 Cases of 'Acute Abdomen' from 1997-2000 Showing Distribution of Patients According to Sex

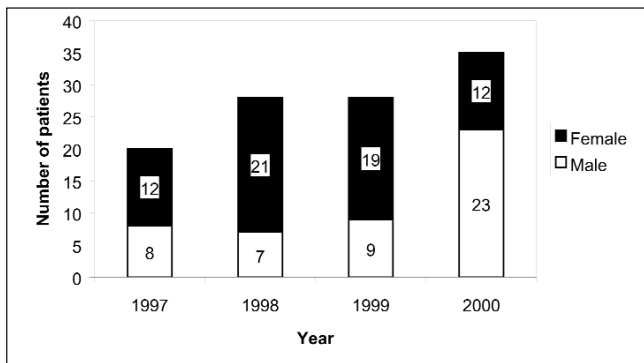


Table I Causes of 'Acute Abdomen'

Primary Cause of Death	Male	Female	Total (%)
Acute gastrointestinal haemorrhage	16	8	24 (21.6)
Peptic ulcer	10	4	14 (12.6)
Other causes ^a	6	4	10 (9.0)
Perforated colon	5	14	19 (17.1)
Diverticulum	4	9	13 (11.7)
Other causes ^b	1	5	6 (5.4)
Perforated peptic ulcer	5	10	15 (13.5)
Acute urinary tract infections	4	11	15 (13.5)
Intestinal obstruction	8	3	11 (9.9)
Mesenteric ischaemia	3	8	11 (9.9)
Acute pancreatitis	2	4	6 (5.4)
Carcinoma of pancreas	2	2	4 (3.6)
Acute cholecystitis	1	2	3 (2.7)
Others ^c	1	2	3 (2.7)
Total	47	64	111 (100)

a Due to adenocarcinoma of gall bladder, cholecysto-colonic fistula, mesenteric ischaemia, rectosigmoid infarction, ulcerated gastric adenocarcinoma, ruptured oesophageal varix, oesophago-gastric tear, acute oesophagitis & gastritis, aorto-jejunal fistula, acute erosive gastritis.

b Due to stercoral ulceration(3), carcinoma, ischaemia, acute enterocolitis.

c Due to ruptured appendix, acute gastroenteritis, pseudomembranous colitis.

Overall, the mean age of patients was 79.4 years (SD 6.3). The difference between the mean age for males [78.2 years (SD 5.7)] and females [80.2 years (SD 6.6)] was not statistically significant.

Peptic ulcer disease

Peptic ulcer disease was the commonest underlying cause of death in this series. Twenty-nine (26.1%) cases of 'acute abdomen' were due to the complications of peptic ulcer disease, namely gastrointestinal (GI) haemorrhage and perforation. There were more duodenal ulcers (20) than gastric ulcers (9). Two patients had a previous diagnosis of peptic ulcer; 6 were prescribed some non-steroidal anti-inflammatory drugs (NSAIDs) or steroids; three were taking either a H₂-receptor antagonist or a proton pump inhibitor. Twelve (41.4%) patients with peptic ulcer disease did not present to any health care service until death.

Intestinal obstruction

There were 9 cases of small intestinal obstructions due to peritoneal adhesions (4), volvulus (3), a caecal carcinoma and a diaphragmatic hernia. Two cases of large bowel obstructions, attributed to a rectal carcinoma and a sigmoid volvulus, were also identified.

Contributory cause of death

In addition to an 'acute abdomen', 68 (61.3%) patients had one or more conditions identified at post-mortem examination as a contributory cause of death. Cardiovascular diseases (mainly hypertension and atheroma) were the commonest and recorded in 43 (63.2%) of them.

Chronic alcohol misuse was recorded as a contributory cause of death in 5 patients.

Medication

The patient's history of prescribed medication was reported by the police in 49 (44.1%) cases. Thirty-one (63.3%) were taking some form of analgesic (ie. NSAIDs, dihydrocodeine) or corticosteroids.

Place of death (Table II) and interaction with the health care service

Table II Place of Death

Place of death	Male	Female	Total (%)
Found dead at home:			
Own residence	23	26	49 (44.1)
Nursing Home	7	8	15 (13.5)
Sheltered House	0	2	2 (1.8)
In hospital:			
A&E	4	9	13 (11.7)
Hospital (other wards)	13	19	32 (28.8)
Total	47	64	111 (100)

Sudden deaths at home

Sixty-six (59.5%) deaths occurred at home. Twenty-four patients had consulted their GPs with some symptoms. Twenty (83.3%) consultations were in the last 24 hours prior to death; two (8.3%) were three days previously; one (4.2%) was 4 days previously.

Thirty-nine (5 of whom were in the nursing home) patients did not come to the attention of any health care staff until found dead. Three patients were attended by paramedics but attempts at resuscitation were unsuccessful.

Sudden deaths in hospital

Forty-five (40.5%) deaths took place in hospital. Of those who died in the Accident and Emergency Department (A&E), 8 were self-referrals, 4 patients were referred by their GPs and one was apparently discovered dead at home by her daughter and son-in-law, then conveyed to A&E.

Among the 32 (28.8%) deaths, which occurred after admission into a hospital, 13 were self-referrals through the A&E, 10 were emergency GP referrals, 5 patients were admitted for apparently non-abdominal conditions, including three cases of fractured neck of femur due to a fall, an admission for physiotherapy and one for the treatment of CREST syndrome and ischaemic foot. Four other patients were transferred from another hospital (3 from a psychiatric hospital and 1 from a cottage hospital).

Only one emergency exploratory laparotomy was carried out but the patient was deemed inoperable. Another two patients died before a laparotomy was commenced. Hence no surgical treatment was undertaken on any patient in this study.

Medical Contact

Sixty-nine (62.2%) patients in this series were seen by a medical practitioner in circumstances arising from the onset of acute abdomen. Thirty-eight (55.1%) patients consulted their GP, 14 (36.8%) of whom were referred to secondary care. Twenty-one (30.4%) self-referred to A&E and 9 (13.0%) were already under hospital care. The remaining patient apparently died at home but was taken to A&E by relatives (where life was pronounced extinct). Table III compares the presentation, provisional diagnosis and the autopsy findings of the 27 (39.1%) patients for whom this information was recorded by the police. In 4 (14.8%) cases the provisional diagnosis was accurate.

Discussion

'Acute abdomen' in the elderly constitutes a heterogeneous clinical entity. This study provides a unique perspective as it examines cases of 'acute abdomen' in the aged, which had been largely unnoticed or undiagnosed until a post-mortem examination, to the extent that these had to be referred to the legal authorities as uncertified deaths.

The results from this study suggest that 'acute abdomen' is increasingly found as a cause of sudden, unexpected death in the elderly. The rising trend could possibly reflect the changing referral pattern to Procurators Fiscal and the growing geriatric population in our society. There was a

Table III Comparison of Provisional and Post-Mortem Diagnoses

Age	Sex	Presentation	Provisional Diagnosis	Post-mortem Diagnosis
70	F	Abdominal pains, diffuse abdominal tenderness, pain, hypotension.	Aortic aneurysm	Acute GI haemorrhage due to mesenteric ischaemia
73	F	Haematemesis	Cardiac arrest: bleeding oesophageal varices	Acute GI haemorrhage due to aorto-jejunal fistula
70	M	Chest pains, anorexia	"Not heart related"	Acute GI haemorrhage due to peptic ulcer
81	M	Found collapsed, dehydrated, rigid abdomen	Infarcted bowel	Acute GI haemorrhage due to peptic ulcer
73	F	Abdominal pains, shocked, cold, confused	Peritonitis	Peptic ulcer-perforated
81	F	Nausea & abdominal discomfort; collapsed with hypotension and high pulse	Postoperative pulmonary embolism or a major cardiac event	Peptic ulcer-perforated
71	F	Vomited, feverish, abdominal discomfort, jaw pain, breathless, peripheral cyanosis, slight tenderness in abdomen	Pulmonary oedema	Colon-perforated diverticulum
74	M	Abdominal pains	Constipation	Colon-perforated diverticulum
75	F	Stomach pains; vaginal discharge	Vaginal fistula	Colon-perforated diverticulum
79	M	Urinary frequency, lower abdominal pain, distended bladder	Urinary retention	Colon-perforated diverticulum
79	F	Abdominal pains, constipation, nausea, distended, tender abdomen but no guarding	Constipation	Colon-perforated diverticulum
85	F	Abdominal pains, fullness in left side of abdomen, extremely unwell	Mesenteric ischaemia	Colon-perforated diverticulum
79	F	Sudden onset of generalised abdominal pain, no motions but passing flatus, guarding, pyrexial	Peritonitis, septicaemia, cardiac failure	Perforated colon due to ischaemia
75	M	Weight loss, gaunt, listless	Diarhoea due to antibiotics for an UTI, malnourished	Perforated colon due to carcinoma
83	F	Stomach pain, "very ill"	Intra-abdominal perforation	Perforated colon due to stercoral ulceration
89	F	Dizzy	UTI	Perforated colon due to stercoral ulceration
74	F	Poor colour, cold, clammy, nauseous, anorexia	Infection	Mesenteric ischaemia
87	F	Unwell; shock	Mesenteric infarction	Mesenteric ischaemia
92	F	Sore stomach, sickness	Gastroenteritis	Mesenteric ischaemia
76	M	Tonic clonic seizures; hypotensive, distended abdomen	Usual seizure for the patient (known chronic epileptic)	Acute intestinal obstruction due to diaphragmatic hernia
89	M	Abdominal pains, distended abdomen	Urinary retention	Acute intestinal obstruction due to ileal volvulus
83	M	Abdominal distention and vomiting	Intestinal obstruction	Acute intestinal obstruction due to caecal carcinoma
73	F	Unwell, sickness, back pain	"Nothing wrong found, hence no treatment"	Acute UTI
92	F	Unresponsive, refused to drink; swollen legs; hypoglycaemia	Cerebrovascular accident Diabetes Mellitus	Acute UTI
77	F	"Chesty"	Exacerbation of COPD	Acute pancreatitis
87	F	Abdominal pains, vomited blood; shrewy, cold, peripherally shut down, tender abdomen, markedly raised amylase	Pancreatitis	Acute pancreatitis
78	F	Diarhoea, anorexia, low urine output for days	Diarhoea due to antibiotics	Pseudomembranous colitis

(Diagnoses in bold = diagnosis confirmed at autopsy)

predominance of females in this study, which is consistent with the findings of other hospital series^{5,6,8,9,11,12} examining acute abdominal diseases in the aged and the higher longevity of females.

The leading causes of 'acute abdomen' in this study, namely, acute gastrointestinal (GI) haemorrhage, intestinal perforations and obstructions all represent a surgical emergency. A retrospective study of 152 patients over the age of 65, who underwent emergency abdominal surgery in a general hospital in a neighbouring city (Glasgow), showed that intestinal obstructions and perforations and GI haemorrhage comprised 92 (60.5%) of all cases.¹² As was the case in our study, peptic ulcer disease was the commonest underlying aetiology, accounting for 40 of the 92 cases.¹²

In a retrospective review of 6962 autopsies in Germany to identify previously unknown peptic ulcer disease as the cause of sudden, unexpected death, 43 such cases were reported and the average age of these patients was 62.2 years.¹³ In an older study of a group of 31 patients in whom perforated peptic ulcer was not diagnosed until autopsy, 24 (77%) were aged 60 or over.¹⁴ These findings highlight the significance of the condition as a cause of sudden death in the elderly. Peptic ulcer disease may

present in the elderly without pain in one-third of patients, but may result in GI haemorrhage, anaemia, nausea, vomiting or weight loss.¹⁵ This may partly explain why there are still a number of clinically unnoticed or undiagnosed peptic ulcers.

Furthermore, frequent use by the elderly patients of NSAIDs and steroids for other concurrent illness obscures their pain perception and at the same time predispose them to developing peptic ulcers or to aggravating pre-existing ulcers.

Nearly one-third of the deaths studied had occurred after admission to hospital (ie. excluding those who died before leaving the A&E). A small number (5) of patients had been admitted for apparently non-abdominal conditions but later died of an 'acute abdomen' on the ward. This underlines the difficulties faced in the management of geriatric patients, which is often complicated by the comorbidity present. At the same time, this underscores the importance of a holistic approach to the management of this group of patients.

Significant challenges are encountered in diagnosing acute abdominal conditions in the elderly patients. They often present with less pronounced clinical features. Their abdominal muscles frequently are thin, due to some degree of atrophy, making them react with less splinting, muscle guarding or spasm.¹⁶ In a retrospective study of elderly patients with peritonitis, abdominal pain was reported in only 55% of the cases, and guarding and/or abdominal rigidity in only 34%.¹⁷ These factors could well explain the non-specific presentation often reported in the patients in this study.

Thirty-four (30.6%) patients in this cohort, who lived in their own home, did not come to the attention of any health care staff until death. One possibility is their fear of being hospitalised with potential institutionalisation and the associated loss of independence. This may prevent many elderly patients from seeking medical attention in an early stage of their disease. There is some evidence from individual cases in this study, which supports such an observation. Moreover, many of the elderly self-diagnose constipation or indigestion and treat themselves accordingly before seeking medical help, thereby delaying the potentially life-saving intervention in the initial phase of their condition.

The comparison between provisional and post-mortem diagnoses illustrates the difficulty of achieving an accurate diagnosis of 'acute abdomen' based on the signs and symptoms extant at the initial presentation. If death had been certified on the basis of the provisional diagnosis, the medical cause of death would have been erroneous. Hence the data highlight the need for autopsy examination in these cases: to audit the provisional diagnosis and to ensure that the accurate cause of death is identified.

The 'acute abdomen' is still an appreciably frequent cause of death in sudden, unexpected deaths, particularly in the older age group. Some of the deaths discussed in the study may have been preventable with an early diagnosis. A high level of vigilance and early attention to an 'acute abdomen' either by primary care or hospital physicians is therefore advocated.

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