

# Acute pancreatitis as a cause of sudden or unexpected death in Northern Ireland

M K Heatley, J Crane

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## SUMMARY

*Utilising incomplete data supplied by the Hospital Inpatient Analysis, the annual incidence of acute pancreatitis in Northern Ireland was estimated to be about 170 cases per million population. The annual mortality rate for the years 1974–1983, using figures obtained from the Registrar-General for Northern Ireland, was 12.3 cases per million. An increase in both incidence and mortality from acute pancreatitis was demonstrated during the study.*

*There were 191 deaths from pancreatitis during the study period and in 27 of these the diagnosis was made only at postmortem examination. Of the undiagnosed fatalities, 10 occurred in individuals with a history of alcohol abuse. Eight of the 27 undiagnosed cases had not sought medical attention, five had presented with a systemic complication of acute pancreatitis, and a further five had only minor gastrointestinal tract symptoms prior to death.*

*The diagnosis of acute pancreatitis requires a high index of suspicion and should be considered in acutely ill patients, particularly those with a history of alcohol abuse, who fail to respond to appropriate therapy.*

## INTRODUCTION

Acute pancreatitis is a condition peculiar to the pancreas in which there is destruction of the gland by enzymes escaping into its substance. It is characterised pathologically by haemorrhagic necrosis and inflammation of the pancreatic tissue and clinically by abdominal pain, vomiting and shock, which may cause death. The clinical diagnosis is usually based on the history, examination and investigations including serum and urinary amylase and ultrasonic and CT scans.

The reported incidence of acute pancreatitis depends on the diagnostic criteria used by the investigator. Graham found an incidence of 238 cases per million using a serum amylase concentration in excess of 2000 iu/l, but with a serum amylase of 1200 iu/l the incidence was 331 per million.<sup>1</sup> Even when similar diagnostic criteria are employed, the incidence of the condition appears to vary in different parts of the United Kingdom,<sup>1, 2, 3, 4, 5, 6</sup> and variations have even been described in different parts of the same city.<sup>7</sup>

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Department of Pathology, The Queen's University of Belfast, Grosvenor Road, Belfast BT12 6BL.  
M K Heatley, MB, BCh, BAO, Registrar in Pathology.

Department of Forensic Medicine, The Queen's University of Belfast.

J Crane, MB, MRCPATH, FFPATHRCPI, DMJ (Clin et Path), Assistant State Pathologist for Northern Ireland.

Correspondence to Dr Heatley.

Several studies have described an increase in the annual incidence of acute pancreatitis,<sup>3, 6, 8</sup> although the number of deaths per year has remained static.<sup>3, 6, 9</sup> Part of the apparent increase in incidence may be due to improved diagnostic techniques and increased awareness of the condition amongst clinicians.<sup>6, 9</sup> On the other hand, comparison of years with high and low incidences show similar proportions of mild and severe disease,<sup>2</sup> and a real increase in the incidence of acute pancreatitis due to chronic alcoholism has been described.<sup>6</sup> In a number of cases, the diagnosis of acute pancreatitis is unsuspected during life and is only made at autopsy. In two series, such cases accounted for 35 % and 41 % of all fatal cases.<sup>2, 3</sup> Some of these may represent patients with mild pancreatic disease which is only fatal if it occurs in combination with other systemic disorders;<sup>8</sup> in others, the symptoms may be due to one of the complications of acute pancreatitis which mislead the clinician.

In this paper we describe a group of 27 individuals who died with acute pancreatitis in the years 1974 – 1983, but in whom the diagnosis was unsuspected during life and made only at postmortem. In addition we estimate the incidence and mortality rate of acute pancreatitis in Northern Ireland.

## **METHODS**

The autopsy reports of fatal cases of acute pancreatitis in which a postmortem examination was carried out by staff of the Departments of Pathology and Forensic Medicine at the Queen's University of Belfast were scrutinised, and cases of acute pancreatitis in which the diagnosis was not made prior to death were identified. Twenty-seven such cases were found. The diagnosis of acute pancreatitis was confirmed by reviewing the available histological sections of pancreas. Clinical information was available in the clinical summary of the autopsy report, and in 10 cases the patients' hospital case notes were also reviewed.

The number of cases of acute pancreatitis for each year between 1974 and 1983 were calculated using the Hospital Inpatient Analysis (HIA), which records the final diagnosis of patients admitted to most hospitals in Northern Ireland. Unfortunately not all the hospitals provide the relevant data. For each year of the study period, the number of cases of acute pancreatitis treated in hospitals supplying data, and an estimate of the proportion of the population of Northern Ireland served by these hospitals were obtained. For example, in 1974 the Hospital Inpatient Analysis received notification of 84 cases of acute pancreatitis. In that year 40% of the population was served by hospitals providing the data. We thus estimated that a total of 210 cases had occurred amongst the total population of Northern Ireland.

The reported annual mortality from acute pancreatitis for the ten-year period was obtained from the Office of the Registrar-General for Northern Ireland. Both the Hospital Inpatient Analysis and the Registrar-General's Office provided figures based on the number of subjects indexed using Code 557-0 of the International Classification of Disease, which also codes for acute relapsing pancreatitis. Incidence figures therefore include these patients, some of whom will have been admitted on several occasions.

## **RESULTS**

Making allowance for the inadequacies of the Hospital Activity Analysis (the data available represented only 40–65 % of the population), the estimated annual

incidence of acute pancreatitis in Northern Ireland varied from 131 per million in 1975 to 246 per million in 1982 (mean annual incidence for 1974–83 was 169 per million).

During the study period there were 191 fatal cases of acute pancreatitis, giving a mean annual mortality rate of 12.3 per million of population (11.9 per million in the years 1974–78 and 12.7 in the years 1979–84) (Table).

TABLE  
*Fatal cases of acute pancreatitis occurring in Northern Ireland  
between 1974 and 1983*

Year	No. of deaths per year	Mortality per million population	No. diagnosed at autopsy per year	Percentage of fatal cases diagnosed at autopsy
1974	17	11.0	—	—
1975	23	15.0	1	4.3%
1976	21	13.7	2	9.5%
1977	18	11.7	4	22.0%
1978	13	8.4	7	53.8%
1979	9	5.8	4	44.0%
1980	18	11.6	2	11.1%
1981	17	10.9	4	23.5%
1982	37	23.6	2	5.4%
1983	18	11.4	1	5.5%
Total	191		27	
Mean	19.1	12.3	2.7	14%

In 27 of these fatal cases (18 male, 9 female), the diagnosis of acute pancreatitis was unsuspected until postmortem examination. The underlying cause of the pancreatitis in these cases included alcohol abuse (10), biliary tract disease (2), trauma (4), hypothermia (2) and hyperparathyroidism (1). No definite cause was found in eight cases. Of these 27 cases, eight had not sought medical attention prior to death, four had consulted their family doctors but had not been admitted to hospital and 15 had been admitted to hospital.

Of the eight individuals who had not sought medical attention before death, two had no history of alcohol abuse and pancreatitis was unsuspected prior to death. These two subjects had complained of mild nausea and vomiting before death but this had not been sufficiently severe to necessitate their seeking medical attention. There was a history of chronic alcohol abuse in the remaining six. Two had complained of nausea and vomiting in the days before death; three were found dead, not having been seen for some days, and one collapsed suddenly and died.

Four patients had been examined by their general practitioner before death, although they had not been admitted to hospital. One had complained of heartburn for which he received an antacid, and a second appeared to have had a respiratory tract infection for which a broad spectrum antibiotic was prescribed. Two complained of acute dyspnoea and died from respiratory arrest.

Fifteen patients had been admitted to hospital prior to death. Three had presented with acute abdominal pain. In two of these a laparotomy revealed fat necrosis and pancreatitis apparently due to biliary tract disease; the third was thought to have intestinal obstruction but died before laparotomy could be carried out. In another two patients, the pancreatitis occurred as the result of hypothermia, and both died whilst being treated for this condition, without a diagnosis of acute pancreatitis being made. A further three patients presented with acute shortness of breath and were treated for congestive heart failure. Two of these had associated pain in the epigastrium and chest; all three died shortly after admission to hospital, and autopsy revealed acute pancreatitis but no cardiac pathology. In the remaining seven cases, conditions other than acute pancreatitis might have contributed to death. In three, the pancreatitis followed surgery, and death was related to the primary condition for which the operation was performed. One case occurred after a road traffic accident with severe head injury. Two chronic alcoholics sustained head injuries after having fallen whilst drunk; the pancreatitis in these two was more likely to be due to their alcohol ingestion than to abdominal trauma. One patient, an 85-year-old woman, had a long history of hypercalcaemia which was thought to be due to primary hyperparathyroidism. She presented with dehydration, chronic renal failure and chest signs. At autopsy, the parathyroids were not enlarged. The autopsy also showed acute pancreatitis and early broncho-pneumonia but no cause for her hypercalcaemia was identified.

## DISCUSSION

The average annual incidence of acute pancreatitis in Northern Ireland was estimated as being 169 cases per million. This estimate is greater than the incidence reported in other cities in the United Kingdom,<sup>2, 3, 4, 5, 6</sup> except in Glasgow where the incidence rate is estimated to be 238 cases per million.<sup>1</sup> During the study period, an apparent increase in the incidence of acute pancreatitis occurred. The mean annual incidence for the first five years of the study was 148 cases per million, and in the second five years 189 cases per million. This reflects the apparent increase reported in other studies.<sup>3, 6, 8, 9</sup>

The case records in each case were not scrutinised to identify patients suffering from acute relapsing pancreatitis. This condition is associated with recurrent episodes of abdominal pain necessitating hospital admission and has a low mortality rate. It is therefore likely that any such patients were admitted to hospital on more than one occasion. Additionally, the incidence depends on the diagnostic criteria used by the investigators. The figures in this paper were based on the frequency of the disease as diagnosed by clinicians and reported to the hospital index. The criteria used in diagnosing acute pancreatitis were reviewed in each case. Had strict diagnostic criteria been applied some cases might not have been included in this estimate of incidence. It is possible therefore that our figures are an over-estimate.

During the study period, no more than 65% of the population of Northern Ireland was covered by hospitals providing data to the HIA, and they tended to be those which served the larger towns and cities. It is recognised that the incidence of acute pancreatitis varies from area to area, even within a given population<sup>7</sup> and the figures which have been estimated only provide an approximation of the true incidence. The average mortality rate for the entire study period was 12.3 cases per million, which is similar to that seen in Great Britain.<sup>3, 6</sup> During the study period, there was a slight increase in the average annual mortality rate in Northern Ireland. In other studies the average annual mortality rate has stayed constant.<sup>6, 9</sup>

It has been recognised for many years that in 30–40 per cent of fatal cases the diagnosis is not made until autopsy.<sup>2, 3, 10</sup> Since a postmortem examination is not carried out on everyone who dies, it would be reasonable to assume that there are additional cases of acute pancreatitis where the condition is not suspected clinically, and where the diagnosis is never made. If these fatalities were included, the mortality rate expressed in terms of the population at risk would be even greater.

A number of patients with acute pancreatitis experience little or no pain.<sup>3, 11</sup> Nausea and vomiting may be the main complaint, and such symptoms, particularly in an alcoholic, may be attributed to a minor gastric condition.<sup>11, 12</sup> Three of the subjects in this study developed acute pancreatitis after an operation. In such cases the patient may not experience pain due to post-operative analgesia and there is a high mortality rate.<sup>3, 5</sup> Two cases presented with respiratory failure and in a further three a diagnosis of congestive heart failure was made. Respiratory failure, cardiac arrest and shock are amongst the most common complications in cases of acute pancreatitis which may be responsible for the patient's death. In these five cases the patients' symptoms misled the clinician, since they related to the systemic complications of acute pancreatitis rather than to the primary illness.

A review of the 27 fatal cases shows that potentially fatal pancreatitis can easily be missed due to mild symptoms and should be suspected, especially in chronic alcoholics who present with upper abdominal pain and vomiting. Further important diagnostic pitfalls include individuals presenting with complications of pancreatitis such as pulmonary oedema, and presentation in the post-operative state. Cases discovered at autopsy account for over one-third of fatal cases, and recognition of these before death, combined with appropriate therapy, might result in a further decrease in the mortality rate associated with this condition.<sup>2, 3</sup>

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