

The Post-mortem Incidence of Abdominal Aortic Aneurysm

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The incidence of death due to rupture of an abdominal aneurysm, as determined by post-mortem examination rather than by death certification, is not known accurately; still less is known of the incidence of unruptured aneurysm or of the natural history of the disease. The Chelmsford Hospital Group serves a fairly compact population of about 200,000; a large sample of all deaths in the area is investigated by post-mortem examination which is carried out in 85% of hospital deaths, in most sudden unexpected deaths and, in recent years, in many deaths of patients attended by general practitioners: Table 1 shows the number of deaths and post-mortem examinations during the last two years. It was thought that a review of abdominal aneurysms occurring in this material might answer some questions about the disease and indicate profitable lines for future investigation.

Table 1
Deaths and post-mortem examinations 1963-4

Total deaths in area	4,600
Post-mortems	1,886 (41%)
Deaths at over 50 years of age	3,990
Post-mortems over 50 years of age	1,544 (40%)

Abdominal aortic aneurysms were found in 46 cases (see Table 2), an incidence of 3% of all post-mortems on subjects over 50 years of age. A ruptured aneurysm had caused death in 23 cases (1.5%): in one case rupture had occurred into the third part of the duodenum, all the others had ruptured into the retroperitoneal tissues. No case of intraperitoneal rupture was found. I believe that, of those who die of a ruptured aneurysm in our area, most come to post-mortem examination. If so, the disease causes one in approximately 200 deaths over the age of 50 years and is therefore not rare.

Of the 23 cases, 11 were brought in dead and 4 died shortly after admission before specific treatment could be given. The remaining 8 died after

Table 2
Abdominal aortic aneurysms

	No. of cases
<i>Ruptured aneurysms</i>	
Brought in dead	11
Died shortly after admission	4
Died after operation	8
<i>Unruptured aneurysms</i>	
Large (over 7.5 cm)	6
Small (5 cm or less)	17

operation. Mr Peter Martin tells me that during these two years in our hospitals 4 patients with ruptured abdominal aneurysms recovered after operative repair. Thus, of a total of 27 cases, only 12 reached the operating table and only 4 of these survived. It can be seen that, even if the operative mortality had been reduced to nil, more than half these people would still have perished: therefore it is obvious that treatment must be applied before rupture occurs if the majority are to be saved.

In another 23 cases (1.5%) unruptured abdominal aortic aneurysms were found incidentally at post-mortem. They fell naturally into two groups: large (all more than 7.5 cm diameter) and small (5 cm diameter or less). There were 6 large aneurysms (3 detected before death) and 17 small aneurysms (none detected clinically). There is no reason to suppose that unruptured aneurysms are more common in our post-mortem subjects than in other people of the same age who die, so that one is probably present in about 1.5% of all people who die over the age of 50 years in our area, as against 0.6% with a ruptured aneurysm.

Table 3 shows the sex and age of the cases: more than three-quarters were men, in accordance with the known preponderance. An unexpected finding was the absence of small aneurysms in women; if confirmed in a larger series this would suggest that the disease is more rapidly progressive in women.

Table 3
Sex and age incidence

	Sex incidence		Age incidence (years)	
	Men	Women	Average	Range
Ruptured	15	8	71	53-88
Large unruptured	4	2	72	66-80
Small unruptured	17	0	70	57-87
Total	36	10		

The relative frequency of unruptured aneurysms in this series suggests that they may exist for a long period, probably several years, before enlarging and sometimes rupturing and it was expected that a significant difference would be found in the average ages of patients with ruptured and unruptured aneurysms. However, there was no such difference; this paradox could be explained by assuming that most small aneurysms remain small, while a few progress rapidly. The presence or absence of hypertension could explain such different behaviour but records and post-mortem evidence of hypertension showed that severe or moderate hypertension was as common in cases of small aneurysms as in large ruptured ones. Perhaps it is the shape rather than the size of the aneurysm which is important in this respect: more attention will be paid to this factor in further studies.

That hypertension is important in this disease is shown by the fact that only 12 of the 46 cases had no clinical or post-mortem evidence of hypertension; 50% of the men and 20% of the women had evidence of severe hypertension, while the average age of the 12 non-hypertensive cases was significantly higher (77 years) than that of the hypertensive cases (69 years).

Unexpected Deaths from Small Bowel Obstruction

by J M Powley FRCS

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In 1839 Amussat stated that death from intestinal obstruction was due to toxins derived from the decomposition and stagnation of intestinal contents. Sixty years later Treves (1899) observed: 'In the case of intestinal obstruction the surgeon is dealing with distended bowels which are filled with septic matter, and very little disturbance of the wall of the gut is required to allow that septic material to reach the peritoneum and cause death from peritonitis and septicæmia.' In spite of modern advances in fluid therapy and surgical technique, there are still grounds for believing that toxins liberated from the bowel in intestinal obstruction can cause sudden death. An attempt has been made to discover the frequency of such deaths. The identity of the toxic factor is also discussed.

Published Mortality Figures

Deaths per million since 1940 from 'intestinal obstruction without mention of hernia' and 'hernia with obstruction' are shown graphically in Fig 1. Deaths from appendicitis are inserted for comparison. The latter have declined steadily but for the past ten years the national mortality

figures for intestinal obstruction have not fallen. The increased incidence of post-operative adhesions is partly responsible: in 1940 deaths from internal obstruction equalled those from obstructed hernia whereas in 1962 they exceeded them in the proportion of 3 to 2. Deaths from both causes reached a total of 2,660, excluding 'hernia without mention of obstruction' (Registrar General's Statistical Reviews, England & Wales). Figures based on clinical series show wide variations in mortality due to differing standards of selection. As in the national statistics, colonic obstruction and obstruction in infancy are usually included. Published mortality rates have varied between 10% and 20% over the past fifteen years (Table 1).

Present Series

The records were studied of 941 consecutive cases of adult small bowel obstruction treated at King's College Hospital and the Royal Sussex County Hospital, Brighton. The period 1949 to 1963 inclusive was covered. Hernias and adhesions accounted for over five-sixths of the cases of obstruction and approximately 1 in 7 died from these two causes (Fig 2). The remaining sixth comprised various diseases, notably mesenteric embolus and carcinoma: the mortality in this group was much higher (41.3%). The mortality from all causes of obstruction throughout the entire period of fifteen years was 18.9%. It fell from 23.9% in the years 1949-53 to 14.6% between 1959 and 1963. Deaths are shown superimposed on the age distribution in Fig 3. More than a third of all victims of small bowel obstruction were over 70 with a mortality approaching 30%. In addition to the hazards of old age, the presence of gangrene in the affected loop of intestine had a marked effect on mortality (Fig 4). There were 125 cases of nonviable bowel. In just over a third, resection could not be performed because of extensive death of bowel or other complicating factors. The mortality in this group

Table 1

Published mortality figures for intestinal obstruction

Author and date of publication	Country	Excluded from series	No. of cases	Percentage mortality
Burgess (1923)	UK		1,278	28.8
Soultar (1925)	UK		3,064	26.2
Vick (1932)	UK		6,892	26.2
Scudder <i>et al.</i> (1938)	USA	Children and tumours	2,150	35.0
Hudson <i>et al.</i> (1941)	UK		670	22.4
Eliason & Welty (1947)	UK		292	11.0
Bollinger & Fowler (1953)	USA	Large bowel, secondary deposits, neurogenic obstruction, temporary inflammation	205	12.1
Wangensteen (1955)	USA		1,252	11.2
Barling (1956)	Australia		355	19.0
Savage (1959)	UK	Hernia and mesenteric infarction	179	15.0
Waldron & Hampton (1961)	USA		493	14.1
Zollinger <i>et al.</i> (1963)	USA	Large bowel	311	10.0
Powley (present series)	UK	Large bowel and under 12 years	941	18.9