

1965 Bickersteth Clinical Lecture

ARTERIAL ANEURYSMS

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In the entrance hall of the New Somerset Hospital there is a mural tablet in memory of Henry Bickersteth, M.D., F.R.C.S.:

In memory of
Henry Bickersteth
Surgeon of the Somerset Hospital
this stone
his medical colleagues erected
his wide-renowned fame
and note-worthy talent
admiring and praising.

His death
Both to the Art of Medicine and to the People
was a great loss.

Today we are gathered together to do honour to this man—one of the great men in the annals of South African surgery. He was the first local practitioner to obtain a Fellowship of the Royal College of Surgeons of England and he established a reputation of having great skill and dexterity as a surgeon.² He was one of the four great surgeons of the Old Somerset Hospital and largely responsible for the so-called Somerset Tradition. He also played a major role in the planning of this New Somerset Hospital.^{2,6,7}

On looking through some of Bickersteth's case records, one of the most remarkable records is of a case of a common carotid aneurysm which he attempted to cure by proximal ligation. This case report was published in the first number of the *Cape Town Medical Gazette* in 1847 and is reproduced below:¹

'William Mc'All, aged 36, a man of color, native of Halifax, in America, admitted into the Somerset Hospital, Cape Town, on the 28th of October, 1845. He is stout built, 5 ft. 6 in. in height, and has always enjoyed excellent health. He has been 10 years in this Colony; where he was paid off from H.M.S. *Andromache*, and has since that period been principally employed as stevedore on board the vessels in harbour.

'Sixteen days ago, whilst stowing away some pipes of wine on board the "Flibberty," he laid down, and with his head thrown backwards, against one of the casks, endeavoured to raise, or alter the position of another with his feet:— whilst using great exertion in this manner, he felt something give way suddenly in his neck, just below the angle of the left lower jaw:— about ten minutes afterwards he perceived a small swelling in this situation, and on going to bed at night, was conscious of pulsation in the part, becoming distressing, when he attempted to lie down:— from that period the swelling and pulsation have gradually increased, and he is now quite unable to work, or bear any exertion.

'The Tumor appears about the size of an orange, and is of spheroidal shape. It is bounded above by the angle and part of the base of the inferior maxilla; laterally, by the larynx, on its inner, and the sterno mastoid on its outer side; and its inferior margin is on a level with the cricoid cartilage. It pulsates strongly—dilates on each throb of the artery, and is partially emptied of its contents by pressure on the Carotid below.

'He complains of constant pain in the back of his head; always aggravated by the recumbent position, and he is perfectly deaf on the left side.

'He has no oppression in breathing or difficult deglutition at present, his tongue is clean. Pulse 80, rather jerking, heart's action and sounds normal.

'Ordered low diet. — Cold compress to the Tumor. V. Sect. ad oz. 16 — Mist. Cathart. oz. 2 S.S

'Oct. 29. — Complains that he has had no sleep for several

nights. He is otherwise relieved since the bleeding, and has suffered less from headache.

Liq. Morph. Acet. drops 8.
Mistura Camph. oz. 1. h.s.s.

'30 — Passed a fair night, but has a return of the dull aching pain in the back of the head and neck. P. 64, soft, tongue clean, bowels regular.

'31 — Complains this morning of severe pain in the left eye; vision not impaired. Slept well till daybreak, when the pain in the head and globe of the eye commenced.

'Nov. 4 — Has continued much the same since last report. — Slept comfortably last night. Pulse 60, regular, heart's action tranquil; pain in the eye and back of the head worse; Tumor evidently increasing in size, and its pulsation becoming more forcible: Under these circumstances it was decided that the common Carotid should be tied with as little further delay as practicable.

Fiat V. Sect. ad oz. 10.

'5 — He has felt a little easier since the bleeding, and the throbbing pain in the head is diminished: he is perfectly calm, and appears well prepared for the Operation which is to take place this day.

'The patient having been laid on the table with his shoulders raised, neck supported by a firm round pillow, and chin inclined towards the right side, the Operation was commenced by an incision through the skin and integument, extending from the inferior margin of the tumor, along the inner edge of the sterno mastoid, to within half an inch of the sterno clavicular articulation. The superficial fascia and platysma were next divided to the same extent, and the edge of the sterno mastoid being now laid bare, the dissection was cautiously continued between it and the trachea, through the deep cervical fascia; a vein of some size now observed traversing the lower angle of the wound, was carefully avoided. Some fibres of the sterno hyoid and thyroid muscles were next divided, and the sheath of the vessels (upon which the descendens noni was distinctly seen) seized with the forceps, and a small opening made on its inner side by a strong probe. This was enlarged on the director to the extent of about half an inch. The internal Jugular vein now came into view, dilating during every respiration, and quite concealing the artery, which appeared to have been thrown somewhat out of its position by the tumor. The Par vagum, instead of being behind, and between the vein and artery, was found lying internal to the latter.

'The vessels were in this situation at a great depth, and it became a matter of some hazard to insinuate a probe between the artery and vein. The pulsations of the artery were also unusually feeble, which added to the difficulty of determining its precise situation, forced as it was behind, and covered by the distended Jugular.

'The probe having been got under the artery, an aneurism needle, armed with a single ligature of thick silk, was passed in the same track, the probe being gradually withdrawn, as the needle was introduced. Having then ascertained that pressure upon the vessel completely stopped the pulsation of the tumor, and that no nervous filaments were included, the ligature was firmly tied: on drawing the second knot the silk unfortunately gave way; another ligature was however passed round in a few seconds, and the vessel secured.

'The man bore the Operation, which lasted about eighteen minutes, most nobly, scarcely uttering a word or moving at all during its performance. He expressed no suffering when the artery was tied, but said he felt much relieved from the distressing pain in the head of which he had previously complained.

'The wound was brought into apposition by one suture, supported by two strips of isinglass plaster, cold water dressing being placed over all.

'11 p.m. — Has been quite easy since the Operation, and had some refreshing sleep. Pulse 84, skin cool. No return of pulsation in the tumor.

'Nov. 6. 9 a.m. — About 1 a.m. slight headache came on, confined to the left side, shooting from the forehead back to the ear. He is now easy and has had some sleep; deafness relieved; he has no thirst or any febrile symptoms. Pulse 96, soft, B. not moved since the operation; but he has constant desire to micturate.

Diet, Arrow Root and Milk.

Capiat Vespere.

Hydr. Chlorid. à à gr. 3.

Pulv. Antim. Comp.

Digitalis, gr. 1.

Extr. Hyoscyami, gr. 2.

Pulv. Jalap Comp. dr. 1, c.m.s.

'7 — He continues quite free from pain; bowels well evacuated; slept well. Pulse 80, soft and regular, skin perspirable, irritability of bladder gone off, tumor much diminished in size, no return of pulsation.

'8 — Slept well all night; felt about daylight a burning itching sensation on the left side of the face and neck; no pain in the wound, which appears united; tongue slightly covered; pulse 72, natural in volume and beat.

'9 — Continues to do well; wound healed, except at the point where the ligature lies; suture removed. Pulse 76.

'10 — Felt a sensation of pain and stiffness in the back of the neck about midnight. This has now gone off, and he feels quite well. Tongue clean. Pulse 64.

'11 — Complains of nothing but an itching sensation all over the left cheek, and in the eye. Pulse 80.

'12 — Going on well, passed an excellent night; bowels acting regularly; tongue clean; Pulse 82. The itching sensation is now confined to the left upper eyelid.

'13 — He reports himself this morning quite easy, and free from pain, but there is some heat of skin, thirst, and acceleration of pulse, which has risen to 100. On enquiry, it appeared that he got up last evening without permission, and walked about outside the ward. The exertion made him feel faint, and he had some difficulty in reaching his bed, upon which he fell with some violence. The Tumor looks less.

Rep. Pilulas Hyd. Chlorid ut suprâ-Vesperè Sumend.

'14 — Febrile symptoms abated; slept well most of the night. Pulse 84. Bowels 5 times moved; Tumor decidedly less, a slight discharge, oozing by the side of the ligature, of a dark venous colour.

'15 — Has passed another comfortable night. Bowels relieved. Pulse 83, skin cool. Tumor free from uneasiness, but it appears much flattened, and there seems to be some swelling and induration of the integuments around it.

'16. 5.25 a.m. — During a rather violent fit of coughing, bleeding to the extent of 3 to 4 oz. took place from the wound; it appeared to be of venous color, and ceased spontaneously. Tumor the same as yesterday, no pulsation in it. Pulse 80, and soft.

R. Tinct. Digitalis, m. 15.

Liqu. Morph. Acetatis, m. 5.

Misturæ Camph. oz. 1, s.s.

Cold water compresses to the neck, and perfect quietude.

'6 p.m. — There has been no return of hæmorrhage, but he has just been seized with severe pain in the tumor, and sensation of distension of its parietes. It is tender to the touch, and feels to him as if it were about to burst. Irritation of the larynx has come on, accompanied by a desire to cough. Pulse continues about 80, and regular.

Rep. Haust, ut supra.

'17. 7 a.m. — Tumor enlarging, painful to the touch, tense and apparently pointing. He had a slight rigor during the night. Pulse 100. Skin acting well. Tongue clean. Deglutition much impeded. Irritation of the larynx continues.

R. Tinct. Opii, oz. ½.

Mist Camph. oz. 7.

M. ft. Lot.

To be applied warm to the neck, and covered with oiled silk.

R. Liq. Morph. Acetatis, m. 12.

Misturæ Camphoræ, oz. 1.

Statim Capiend.

'9.30 a.m. — Since the draught and opiate application, he has been easier. appearance of Tumor the same: no return of hæmorrhage. He is only able to speak in a whisper, and is constantly clearing the larynx of mucus by a short cough.

'18 — Passed an easy night. Tumor becoming more prominent, and very tender. Pulse 100.

'19 — Had a bad night. Tumor pointing at the spot which had been most prominent before the operation, about 2½ in. below the angle of the jaw. Cuticle beginning to detach. Complains of great soreness of the left eye, and the globe is found very tender on pressure: irritability of the larynx, and difficulty of swallowing continues. Pulse 84. Bowels relieved.

Appl. Cataplasma Commun. Rep. Haustus Anodyn.

'19 — The cuticle has detached and exposed a dark sloughy state of the integuments; Eye still gives him great pain, and he feels very restless and disinclined to sleep. Pulse feeble.

C.C. Tempori Sinistræ, oz. 6.

Ammon. Sesquicarb gr. 6.

Liq. Morph. Acetatis, m. 12.

Misturæ Camphoræ, oz. 1, s.s.

'20 — Obtained some sleep from the draught and feels better; complains much of the eye, which has now become very intolerant of light: Conjunctiva much congested, and chemosis commencing. Tumor appears as if on the point of rupturing: slight cough and difficulty of swallowing continue.

'21 — Slept well, deglutition more difficult, left eye extremely painful, vision lost. The globe appears forced outwards and protruding from the orbit, no particular uneasiness in tumor. Pulse 60, feeble.

'22 — Passed a fair night; about 4 oz. dark colored blood escaped from the tumor last night, and there is this morning a purulent discharge on the dressing, tinged with blood. Suppuration has taken place in the left eye, the anterior chamber of which is filled with matter. Ligature still firm.

6.30 p.m. — Sudden hæmorrhage come on at this hour from the tumor, the blood, evidently arterial, came welling up as if from a large vessel, and more than two pints were lost before it could be restrained; a graduated compress was applied, and properly secured by bandage, but the bleeding has left him in a state of syncope; surface cold, radial pulse scarcely perceptible.

'23 — No return of hæmorrhage, and he has somewhat rallied. Pulse 64, very compressible; slough gradually separating over the whole anterior part of the sac.

Ordered beef tea, 2 eggs, and porter 1 pint.

'24 — Reports that he slept well till 4 a.m. when he awoke hungry, and feeling much better, ate heartily, and swallowed without difficulty. P. 60 and firmer. The whole sac seems as if about to turn out by slough. There is considerable discharge, but no further hæmorrhage. Eye totally lost.

7.30 p.m. — On removing the dressings, the slough appeared almost detached and hanging over towards the right side of the neck; with a little division by the scissors at one portion, it was all separated and taken away; the parts beneath being now laid bare, the original aneurism was distinctly seen below the angle of the jaw about the size of a walnut, and of dark color. No further hæmorrhage.

'25 — Slept well, feels in no pain, and swallows without any difficulty, all irritation of the larynx has also subsided, wound in the neck looks clean, and is commencing to granulate: no hæmorrhage. Pulse 78, tongue clean. From this date he went on well till the

'28th, 5.45 a.m. — Hæmorrhage came on again in a large stream, which poured from deep beneath the angle of the jaw, and nearly 1½ pints of blood were lost before it was checked. Strong styptic applications and compresses at length arrested it.

'29 — No return of bleeding since last report, the wound in the neck looking healthy and filling up. The small sac at the bottom of the wound appears detaching, layer by layer, from its connections.

'Dec. 1 — Nothing untoward has occurred since last report; ligature came away this morning early. He complains of no pain; wound left by the sloughing of the sac contracting. Pulse 84. Tongue clean, Bowels regular.

'12.30 p.m. — Hæmorrhage occurred again to the extent of a pint, the source of bleeding still the upper portion of the sac.

'2 — Slept quietly, but is very low. Pulse scarcely perceptible, respiration becoming hurried, extremities cold.

'3 — Seized this morning with convulsions, affecting the right side of the body, and leaving it partially paralyzed, he is now unable to articulate.

'On the 4th and 5th, haemorrhage to a slight extent again occurred, and he lingered till the afternoon of the 6th, when he died at 2.30 p.m. 31 days after the operation.

Autopsy — 40 Hours after Death

'Previous to the examination being made, the Axillary arteries were tied in each arm, and the descending Aorta in the thorax. An injecting pipe being then placed in the Aorta at its origin from the left ventricle, the common wax injection was thrown in; the injection soon poured out in a stream from below the angle of the jaw, into the aneurismal sac, taking the same direction the haemorrhage had during life. After the injection had cooled sufficiently, the dissection was commenced. The left clavicle having been sawn through and removed, and the integuments of the neck dissected off, the common Carotid of the left side was exposed from its origin to its termination. The injection had filled the vessel up to the point round which the ligature had been applied, and here the canal of the artery had become impervious. From this situation up to the seat of the aneurism, the vessel was found shrunk and collapsed. The portion of the artery above the ligature was still pervious, admitting a small probe to be passed up to its bifurcation. The aneurism was found to have occurred exactly at the division of the common trunk into internal and external, and of the two latter the external Carotid appeared to have been the most implicated. The internal Carotid opened directly into the sac and appeared fully as large as usual; a good sized thermometer tube could be passed with ease into the opening from the aneurism in an upward direction till stopped by the injection, which had run down in the course of this vessel. The external Carotid was much contracted, admitting only a small probe. The Jugular vein was now examined, and found uninjured; its canal laid open, and no trace of inflammatory action discovered. The Par vagum, as far as could be ascertained, appeared also uninjured. The Vertebral artery on the left side seemed of larger size than usual, as also the ascending Cervical and inferior Thyroid of the same side. The aneurismal sac itself had shrunk to small size, and seemed hardly large enough to contain a walnut. Its anterior parietes were found quite destroyed by the sloughing action that had been going on. The Brain was now examined carefully and minutely, and no appreciable morbid indication could be found. The right Ophthalmic artery was observed to be nearly $\frac{1}{2}$ larger than the left. The left optic nerve seemed healthy, nor could any cerebral lesion be made out after the most minute investigation.

'The injection had minutely filled the vessels at the base of the brain, and the free anastomosis in this situation appeared evidently to have conveyed the blood by a retrograde course down the internal Carotid into the sac, from which point the haemorrhage which ultimately proved fatal, had so repeatedly taken place.

'The arch of the Aorta, with its primitive trunks, were now removed with the aneurism attached, for the sake of making a preparation of the parts; a portion of the sheath was left adherent at the point of deligation, to preserve the appearance of the parts in situ.'

DISCUSSION

In his discussion of this superbly documented case Bickersteth refers to a subsequent case of femoral aneurysm which he treated successfully by proximal ligation combined with distal *compression* of the artery.

Even in these modern times many a surgeon will hesitate to operate on a carotid aneurysm. Imagine how formidable it must have been in 1845 without anaesthesia, without antiseptics and without blood transfusion. It is true that this was nothing new even in those far-off days, because aneurysms had interested surgeons for many generations and John Hunter had placed the practice of proximal ligation on a rational basis as long ago as 1786.¹⁰ However, throughout the nineteenth century very few successes were obtained and then only by men of the calibre of Sir Astley Cooper, Valentine Mott, John Abernethy, William Halstead and Sir James Syme.^{9,10}

How different things are today. With modern anaesthesia, powerful antibiotics, fresh blood, cardio-pulmonary and other bypass techniques, hypothermia, IPPR, steroids, vasopressors, anticoagulants, mannitol, rheomacrodex and on-the-spot facilities for measuring and correcting abnormalities in serum electrolytes and blood gases, no aneurysm is too large, too inaccessible or too far advanced to be removed. It is now possible to treat successfully aneurysms involving the aortic arch or upper abdominal aorta with all their branches, and in many centres the mortality of ruptured aortic aneurysms, the most serious of all surgical emergencies, has been reduced to a figure below 50%.

EXPERIENCES WITH ARTERIAL ANEURYSMS—GROOTE SCHUUR HOSPITAL

Have we, the successors of Bickersteth, followed in his footsteps and kept up with modern trends in surgery? At least we have tried, and I shall now briefly present to you our experiences with arterial aneurysms over the last 4 years to give you a glimpse of our efforts.

During this 4-year period 165 patients suffering from aneurysms of various types were admitted to the Professorial Surgical Unit at Groote Schuur Hospital. These constituted 12% of all vascular cases treated by the Unit during that period.

Aetiological Classification

The aneurysms have been divided into 5 main aetiological groups, viz. atherosclerotic, syphilitic, mycotic, traumatic and 'other' (polyarteritis nodosa, non-specific aortitis, congenital, and unknown). Table I shows the racial and

TABLE I. 165 ARTERIAL ANEURYSMS (1961-1965)

	Athero-sclerotic	Syphilitic	Mycotic	Traumatic	Other	Total
White	94	3	2	4	3	106
Coloured	9	15	3	11	9	47
Bantu	1	6	3	1	1	12
Male	84	23	5	14	10	136
Female	20	1	3	2	3	29
Mean age	65 yrs.	55 yrs.	45 yrs.	33 yrs.	—	—

sex distribution as well as the mean age of the various groups. Atherosclerosis accounted for 63% of the cases and White males were most commonly affected. Syphilitic and traumatic aneurysms were particularly common among Coloured males and presented at a much younger age than the atherosclerotic aneurysms. These findings agree with those in other series.^{9,10}

Table II shows the vessels affected. Peripheral vessels were involved in 25%, and the commonest causes were

TABLE II. 165 ARTERIAL ANEURYSMS

	Athero-sclerotic	Syphilitic	Mycotic	Traumatic	Other	Total
Peripheral	17	3	5	13	3	41
Thoracic	3	20	—	2	4	29
Abdominal	82	1	2	—	3	88
Visceral	2	—	1	1	3	7
Total	104	24	8	16	13	165

atherosclerosis and trauma. The thoracic vessels (aortic arch, innominate artery and descending aorta) were affected in 17%, and 70% of them were of syphilitic origin. The abdominal aorta and/or iliac vessels were affected in 53% of the cases, and 93% of them were

atherosclerotic. Visceral arteries (splenic, renal, hepatic and coronary) were involved in 3% of cases only.

It has long been recognized that without treatment most aneurysms prove fatal either by rupture, by dissection, by thrombosis and embolization or by pressure on surrounding structures.^{9,10} With modern treatment most of the patients can be saved and the over-all mortality in this series was 20% (Fig. 1).

158 ARTERIAL ANEURYSMS.

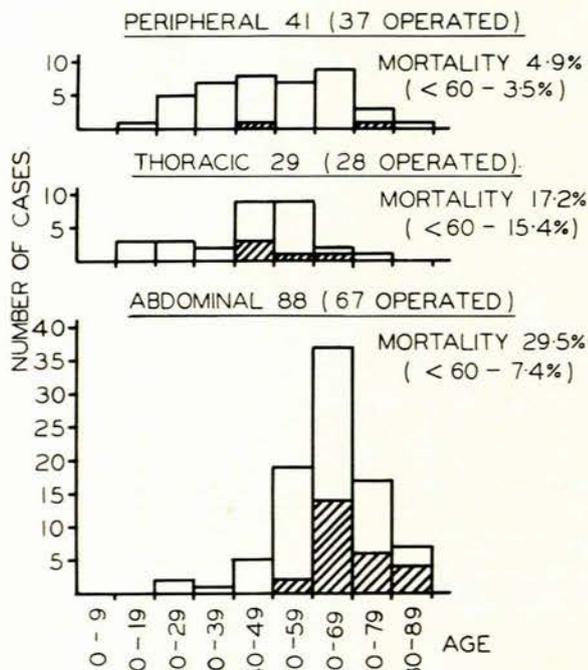


Fig. 1. 158 arterial aneurysms.

Peripheral Aneurysms

Among the peripheral vessels the femoral and popliteal were most frequently affected (21 cases) and atherosclerosis was the usual cause (Table III). Of the 10 cases with

TABLE III. PERIPHERAL ARTERIAL ANEURYSMS

	Athero-sclerotic	Syphilitic	Mycotic	Traumatic	Other	Total
Carotid	1	2	1	1	1	6
Subclavian	1	1	1	2	1	6
Axillary	—	—	—	3	—	3
Brachial	—	—	—	1	—	1
Distal arm	—	—	1	1	1	3
Femoral	8	—	2	1	—	11
Popliteal	7	—	—	3	—	10
Distal leg	—	—	—	1	—	1
Total	17	3	5	13	3	41

popliteal aneurysms, bilateral lesions were present in 6. Of the 11 cases presenting with femoral aneurysms, 3 had bilateral lesions and 3 had smaller lesions of other major vessels. Carotid and subclavian aneurysms constituted the second largest group (12 cases) and were due to a variety of causes. Aneurysms of the remaining vessels were mainly traumatic.

Peripheral aneurysms have the best prognosis (4.9% mortality in our series—Fig. 1), but it is only in the smaller peripheral vessels that increase in size may be so slow that the patient dies of some intercurrent disease.^{9,10} However, they are often of considerable inconvenience to the patient and may lead to loss of a limb. Fortunately they are easily accessible and hence most amenable to surgical treatment. Aneurysms of the carotid and subclavian, on the other hand, constitute a serious threat to life, and although they are accessible, surgical treatment is hazardous because of the risk of cerebral infarction. With the use of bypass procedures and/or hypothermia, however, it is possible to remove them with comparative safety, and the 6 carotid and 6 subclavian aneurysms in this series were successfully removed without a fatality.

Thoracic Aneurysms

Untreated thoracic aneurysms are invariably fatal, and Colt in 1927 found that the average survival period from diagnosis was less than 2 years.³ Until the advent of cardio-pulmonary bypass, surgical therapy was extremely dangerous and almost invariably doomed to failure. With modern techniques, however, the outlook has changed completely and the mortality of these lesions in the hands of our cardio-thoracic team at Groote Schuur Hospital has been reduced to the record low level of 17.2% (Fig. 1). It should be pointed out that the mean age of patients with thoracic aneurysms was two decades less than that of patients with abdominal aneurysms. Furthermore, since most of the aneurysms were syphilitic, the rest of the vascular system was usually normal (Table IV). On the

TABLE IV. 'CENTRAL' ARTERIAL ANEURYSMS

	Athero-sclerotic	Syphilitic	Mycotic	Traumatic	Other	Total
Thoracic aorta	3	6	—	—	4	13
Aortic arch	—	11	—	1	—	12
Innominate	—	3	—	1	—	4
Total thoracic	3	20	—	2	4	29
Abdominal aorta	80	1	—	—	3	84
Iliac	2	—	2	—	—	4
Total abdominal	82	1	2	—	3	88
Visceral	2	—	1	1	3	7
Total	87	21	3	3	10	124

other hand, many of the aneurysms were far advanced when the patients first presented—in 2 survivors the aneurysms were already 'pointing' under the skin over the anterior chest wall and in 5 cases the aneurysms had ruptured. The results are truly remarkable.

Abdominal Aneurysms

The prognosis of untreated abdominal aneurysms is just as serious as that of thoracic aneurysms. Estes found that of 102 cases half were dead after 3 years and only 10 alive after 8 years (normal life expectancy 65%).⁵ Wright *et al.* in a study of 60 cases found that only 40% survived 2 years from the time of diagnosis and all were dead within 7 years.¹¹ Barratt-Boyes found that 46% died of rupture of the aneurysm and 20% of cerebral haemorrhage or cardiac failure.¹⁰

In view of the above it is now our policy to advise surgical treatment of abdominal aneurysms as soon as the diagnosis is made. However, most of these aneurysms are atherosclerotic (Table IV), and many of the patients are extremely old and frail with diffuse vascular disease and impairment of cardiac, renal and cerebral function. A certain amount of selection is therefore inevitable. Thus, during the past 4 years, we have operated upon 76% of the patients admitted to our wards with abdominal aneurysms. The mean age of these patients was 65 years, and the over-all mortality 29.5% (Fig. 1). It should be noted that the mortality in patients under the age of 60 years was only 7.4% (which is all the more significant in the light of Colt's findings with regard to untreated aneurysms, viz. the survival period is twice as great in patients over 60 as in those aged 35 or less).

Since abdominal aneurysms constituted more than half our material and are still associated with considerable mortality, I propose discussing them in more detail.

In the first place, it should be pointed out that the over-all immediate mortality rate (i.e. death within 30 days) for abdominal aneurysms has steadily decreased from 60% in 1957 to 30% in 1964-1965 (Fig. 2). This

MORTALITY OF ABDOMINAL ANEURYSMS.

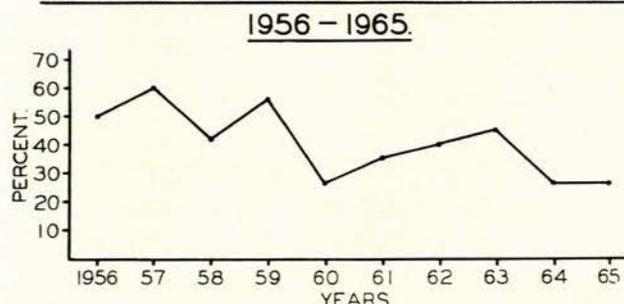


Fig. 2. Mortality of abdominal aneurysms (1956-1965).

does not compare favourably with the figure of 9% reported by DeBakey *et al.*,⁴ but there are a number of adverse factors in our series which merit consideration, viz.:

1. The ages ranged from 22 to 89 years with a mean of 64.3 years (Fig. 3). Twenty-five% were 70 years of age or older (DeBakey *et al.* 20%). The mortality in patients under 60 years was 7.4% and in those over 60 it was 39.2%.

88 ABDOMINAL ANEURYSMS - PROGNOSIS.

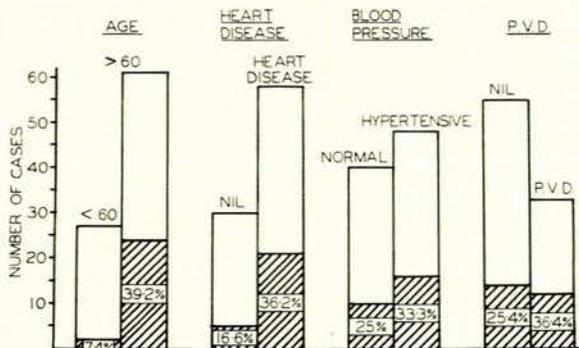
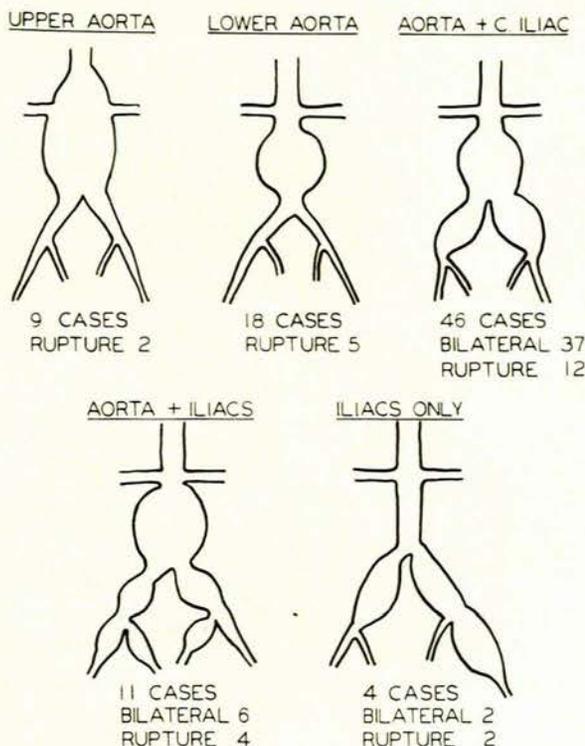


Fig. 3. 88 abdominal aneurysms—prognosis.

2. Associated cardiovascular disease (Fig. 3). Heart disease and/or hypertension was present in 75% of the cases (DeBakey *et al.* 68%). The mortality was increased by 20% in patients with heart disease and by 8% in those with hypertension. Peripheral vascular disease was present in 34% and this increased the mortality by 11%.
3. Condition of the aneurysm. The sizes and situations of the aneurysms are shown in Fig. 4. It should be noted that the

88 ABDOMINAL ANEURYSMS.



- ASSOCIATED FEMORAL ANEURYSMS --- 10
- ASSOCIATED POPLITEAL ANEURYSMS --- 3
- ASSOCIATED THORACIC ANEURYSMS --- 5

Fig. 4. 88 abdominal aneurysms.

lesions were limited to the infrarenal aorta in only 18 cases (20%) and to the iliacs only in 4 cases (3%). In the 66 patients subjected to surgery extensive grafts were, therefore, necessary in no less than 52, i.e. 80%, with 21 deaths (mortality 40%) while limited grafts were possible in 14 with only 1 death (mortality 7%) (Fig. 5).

More important than the size of the aneurysm is the question of recent haemorrhage (Fig. 6). No less than 25 (28%) of our patients presented with frank rupture (DeBakey *et al.* 8%). The mortality of unruptured aneurysms was 12.7% (DeBakey *et al.* 7%) and the mortality of ruptured aneurysms was 72% (DeBakey *et al.* 34%). It is obvious that our rather high over-all mortality was due, in the first place, to the large proportion of ruptured aneurysms and, in the second place, to the excessively high mortality of such aneurysms. In regard to the latter it should be mentioned that according to world literature the mortality of patients operated upon for ruptured aneurysms ranges from 50 to 80%.⁵ Our operative figure of 68% is therefore not quite as poor as it appears to be vis-à-vis the results of DeBakey *et al.*⁴ Furthermore, more than half the patients with ruptured aneurysms were admitted in extremis, and 2 died before they reached the operating

theatre. Also, 84% were over 60 years old and 12% were over 80 years. It would therefore be more correct to claim that we managed to salvage 32% of these patients because, without surgery, the lesions would have been undoubtedly and swiftly fatal.

It is rather disturbing that almost one-third of the patients suffering from abdominal aneurysms did not reach us until they were in extremis owing to rupture. This, I believe, is due to two main factors, viz.:

GRAFTS IN 66 RESECTED ABDOMINAL ANEURYSMS.

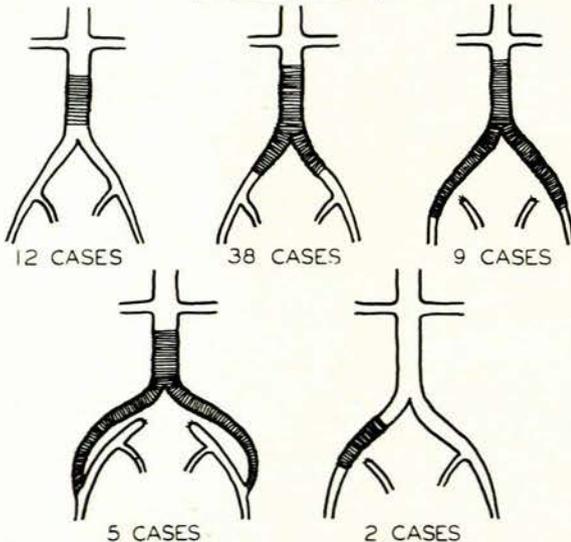


Fig. 5. Grafts in 66 resected abdominal aneurysms.

ABDOMINAL ANEURYSMS. PROGNOSIS.

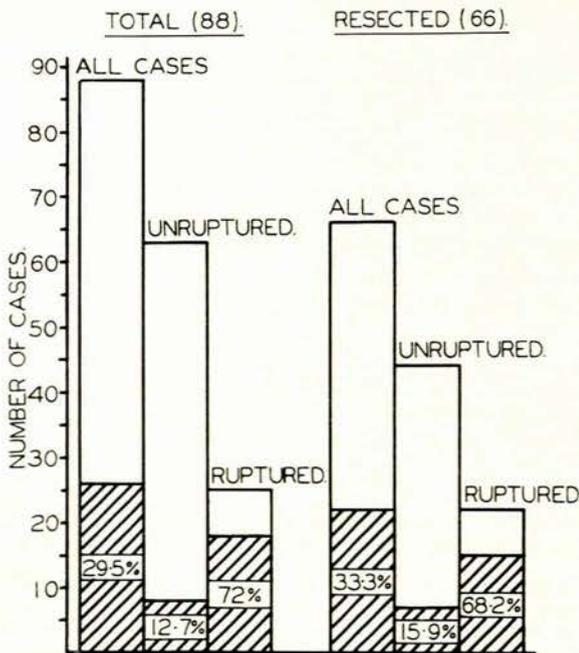


Fig. 6. Abdominal aneurysms—prognosis.

1. A certain reluctance on the part of many doctors to advise surgical removal of unruptured aneurysms.
2. A lack of awareness of the frequency and symptomatology of abdominal aneurysms.

The first can surely be put right by a change of heart. I have already indicated the dreadful prognosis of untreated aneurysms and pointed out that more than half the deaths are due to rupture. This should be contrasted with the comparatively low mortality associated with resection of unruptured aneurysms and the observations of De Bakey and others that once the patient survives the immediate effects of the operation, his life expectancy closely approaches that of the normal population, at least for the first 5 years.

As far as early diagnosis is concerned, it is most important to look for the presence of an aneurysm in every patient over middle age. It requires no particular skill to find a pulsating mass in the abdomen provided pulsation is looked for and a stethoscope used to detect an associated bruit.

What about symptoms to arouse our suspicions? (Fig. 7). Firstly, let me point out that in 13 (15%) of our patients

88 ABDOMINAL ANEURYSMS. PRESENTATION.

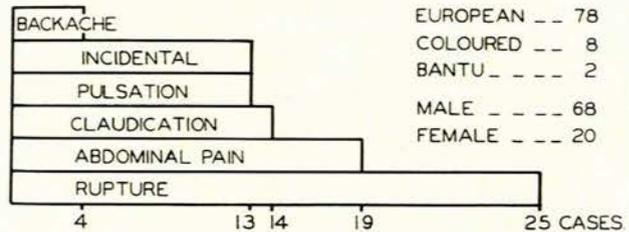


Fig. 7. 88 abdominal aneurysms—presentation.

there were no symptoms, and the aneurysms were discovered on routine examination. Then there were 25 (28%) who presented with symptoms owing to rupture, but no less than 80% of them, in fact, had previous symptoms which should have led to a diagnosis. These symptoms were similar to those encountered among the cases with unruptured aneurysms.

Fig. 7 reflects only the presenting symptoms in unruptured abdominal aneurysms, and often patients complained of several of the symptoms listed, a dull backache being particularly common. Time precludes a detailed discussion of the symptomatology, and a few remarks about the presenting symptoms will have to suffice. Abdominal pain was the commonest presenting symptom and present in 19 (30%) of the unruptured and 21 (84%) of the ruptured aneurysms. It was situated in all parts of the abdomen (Fig. 8) and often attributed to gastric, biliary, pancreatic, colonic, renal or even appendicular pathology. Claudication was also a common presenting symptom in unruptured aneurysms, and although it was usually and correctly attributed to peripheral vascular occlusion, the presence of an associated aneurysm was frequently overlooked. Backache was the presenting symptom in 4 cases only but was present in fully 50% of the patients and responsible for a large variety of diagnoses.

It should also be pointed out that symptoms were often present for months and even years before the patients were referred for surgery (Table V). A long history does not necessarily rule out the presence of an abdominal aneurysm and unless we are constantly on the lookout for the condition, the diagnosis may not be made until it is

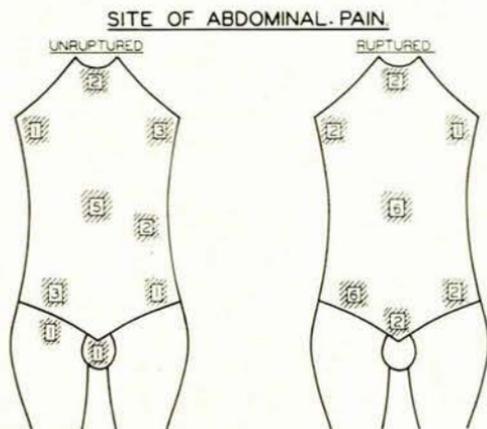


Fig. 8. Site of abdominal pain.

too late. Let us, therefore, make it a rule to consider the possibility in every patient past middle age, particularly if he complains of abdominal pain, throbbing in the abdomen, claudication or backache.

If this lecture has served no other purpose, I trust that it has at least brought to your notice a condition which is increasing in frequency and demands urgent surgical

attention. Today we have all the facilities for dealing with arterial aneurysms and, because of our ageing population, plenty of material. Imagine Bickersteth's joy if he could

TABLE V. DURATION OF SYMPTOMS—88 ABDOMINAL ANEURYSMS

	<i>Ruptured</i>	<i>Unruptured</i>
Incidental	—	13
1-24 hours	9	—
24-48 "	6	—
48-72 "	4	—
3-7 days	3	2
1-4 weeks	3	8
1-2 months	—	7
2-3 "	—	11
3-6 "	—	7
6-12 "	—	6
1-2 years	—	4
2-5 "	—	2
5-10 "	—	3
	25	63

have had our opportunities. Let us emulate his example and follow the advice of Francis Bacon who said: 'A man must make his opportunity as oft as find it.'

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