

that once the patient survives the immediate effects of the operation, his life expectancy closely approaches that of the normal population during the first five years, following which there is a gradual decrease in life expectancy.

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DISCUSSION

DR. D. EMERICK SZILAGYI (Detroit): The justification for the resective treatment of abdominal aortic aneurysm, excepting those lesions with expansion or rupture, is the prolongation of the life expectancy of the patient. The extent to which this goal has been achieved can be judged in two principal ways: first, by comparing the postoperative survival rates with the survival rates of a comparable standard population, as was done by the essayists in their beautiful and monumental study; and, secondly, by comparing the survival rates of two groups that are essentially similar but had surgical and nonsurgical treatment respectively. It may further clarify the problem of the value of abdominal aortic aneurysmectomy if we take a brief look at the results of a study in which the second method was used.

(Slide) In this slide the percentages of post-operative survival of 305 patients with abdominal aortic aneurysm that had resective therapy between 1952 and the early part of 1963 are compared with the survival rates of 200 cases of abdominal aortic aneurysm without surgical treatment observed both before and after the inception of resective surgical management in 1952.

Aside from the fact that the two series were not simultaneous, the statistical parameters were in both groups essentially the same. In particular, the nonsurgical group comprised very few cases that were refused surgical treatment for reasons of operative risk, as our own operative indications were nearly as broad as those of the essayists.

It is evident that the survival rate of the surgically treated patients was consistently and considerably higher than that of the nonsurgical cases throughout a recorded period of eight years, at

the end of which no patient without surgical treatment remained alive.

Please note that this difference in the rates of survival should not be read off the ordinate by a simple subtraction of the figures. For instance, at the third postoperative year the magnitude of the superiority of the survival rate of the surgical patients over the nonsurgical patients is not merely the difference between 50 and 20 per cent. The improvement in survival at this point actually is 150 per cent.

(Slide) That this difference is due largely to the removal of the aneurysm is illustrated by this slide. The cause of death in 53 per cent of the nonsurgical cases was rupture of the aneurysm.

DR. DAVID M. HUME (Richmond): I would like to comment on the improvement in the mortality from ruptured aneurysms—which is evident in the talk just presented to you. Dr. Crawford's mortality, over-all, was 34 per cent, in contrast to figures of 50 to 80 per cent given in the literature.

We recently reviewed the series at the Medical College of Virginia of 25 patients operated upon for ruptured aortic aneurysm over the past five years and 20 over the past three years. The operative mortality was 35 per cent over five years and 26 per cent over three years.

The series included patients in profound shock, with massive rupture; no slow leaks were included in the series. It included survivals amongst a number of patients who had to have clamping of the aorta above the renal arteries to get control, one cardiac arrest, one patient with congestive heart failure prior to the operation, three patients with free rupture into the peritoneal cavity, one patient with a horseshoe kidney which had to be mobilized before the aneurysm could be resected, two patients cerebrovascular accidents, and one patient with massive gastro-intestinal hemorrhage; so I think this does indicate that the mortality from ruptured aneurysms has been improving through the years.

I would like to ask Dr. Crawford what he thinks about the use of mannitol. We believe that this has contributed to the diminished mortality in our hands, together with getting the patient to the operating room as rapidly as possible and getting the aneurysm out as fast as possible, leaving a portion of the back wall of the aneurysm *in situ*.

DR. SAMUEL WILSON MOORE (New York): We are used to the astronomical figures which come from Houston, and I certainly congratulate Dr. Crawford and his group on the wonderful presentation which he has made. My main thoughts are on follow up, and the association of abdominal aortic aneurysms with peptic ulcer and malignant disease.

A follow up of 98.4 per cent is tremendous. We have lost two patients in our follow up, one of whom was a drug addict who left without a forwarding address, and also without paying either his hospital or his surgeon's fee, and naturally he is a little hard to find.

We have found peptic ulcer in 20 per cent of these aneurysm patients. One patient bled rather vigorously following operation and required another operation on his second postoperative day. He recovered.

Another patient, 82 years of age, had a massive hemorrhage, necessitating the removal of the larger portion of his stomach, including the entire lesser curvature up to the esophagus. He did not recover.

The main thing we have uncovered by follow up is the association with cancer. Of all our late deaths, one-third, 33 per cent, have been due to cancer. In addition, cancer is associated with abdominal aortic aneurysm in 28 per cent of our total follow up.

This causes us to do a very careful examination of the abdominal viscera at the time of operation. One patient died as a result of massive hemorrhage. We could find nothing, but autopsy revealed a carcinoma of the duodenum.

DR. E. STANLEY CRAWFORD (closing): I am not sure that mannitol is of value in the prevention of acute renal failure in patients submitted to operation, particularly in those with rupture, hypotension, and anuria. Although mannitol administration has not been harmful in such cases, I have been dependent upon immediate expeditious surgery, adequate blood replacement, and conservative therapy for the renal problem, utilizing dialysis if necessary.

The incidence of late death from cancer in this series was the same as that in the general population. The death rate from cardiovascular diseases in the series was considerably greater than that in the general population.