

AMPUTATION AS CAUSE OF CARDIOVASCULAR DISORDERS

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... an editorial

When the Veterans Administration was charged with determining whether amputation was a causal factor in cardiovascular diseases, there was general skepticism that such a relation existed. Indeed, a review of the scientific literature increased the doubts. It now seems that we were wrong and some interesting new research prospects have appeared.

The story begins when Congress, stimulated by a veterans organization, passed the Veterans Disability, Compensation, and Survivor Benefits Act of 1976 (Public Law 94-433). The Act mandated two studies: critical review of the extant scientific information and an epidemiological study of veterans who had amputations as a result of injuries. Initially the Act allowed only 9 months to complete both assignments. The literature review could be and was finished within this period, but the epidemiological study could not possibly be conducted within so short a time so that its completion and submission were rescheduled for the end of February of this year.

The literature review included seven studies of the late effects of amputation in England, Finland, Germany, and the United States. None of them included comparisons with appropriate controls, and only one supported the appearance of cardiovascular defects or later increased mortality after uncomplicated amputation of the lower limb. The others found no correlation.

The epidemiological study, conducted by the Medical Follow-Up Agency of the National Academy of Sciences — National Research Council, has been sent to Congress. The authors, Zdenek Hrubec and Richard A. Ryder, determined the mortality rates among 12,000 army veterans who were hospitalized for trauma during 1944 and 1945. The men were divided into several groups: amputation at or above

the knee or at or above the elbow ("proximal" amputations), amputation of part of a hand or a foot ("distal" amputation), and disfiguring injury not requiring amputation. The followup period extended from January 1946 to April 1977.

"Proximal" amputation of the lower limb resulted in an overall mortality approximately 1.4 times as great as that among disfigured veterans. Mortality from ischemic heart disease was more than 1.5 times as great and from other cardiovascular diseases was almost 1.7 times as large. Bilateral leg amputation carried an even larger overall risk but "distal" amputees and arm amputees were at no definitely increased risk of dying.

The epidemiological study is by far the best-controlled large study of the impact of amputation on life expectancy. It does not—nor was it designed to—reveal the causal mechanisms of the effects observed. Drs. Hrubec and Ryder offered several suggestions, the most likely of which relate to physical activities of upper-leg amputees. It is not clear, however, whether the increased exertion required for amputees to walk or the decreased exercise due to the handicap is responsible. Both may play a part but further research will be needed to determine why amputation adversely affects the cardiovascular system.

One thing seems likely—there is more reason than ever to amputate at as low a level as possible, even in young people without preexisting cardiovascular diseases. It is even more reasonable to follow the same course when the patient already has an impaired circulatory system, as is usually the case in civilian practice today.

If causal mechanisms can be found, the post-operative management of lower limb amputees could be tailored to reduce the risk of later cardiovascular difficulties. This is an area where collaborative research of cardiologists, orthopedic surgeons, and later of prosthetists, physical therapists, and rehabilitation experts offers opportunities for major contribution to solving the problems of amputees.

Editor's Note—The complete literature survey and the subsequent statistical study have been published as 96th Congress, 1st Session, Senate Committee Print No. 6, Causal Relationship Between Service-Connected Amputation and Subsequent Cardiovascular Disorders, Studies Submitted by the Veterans Administration Pursuant to Section 403, Public Law 94433, to the Committee on Veterans Affairs, U. S. Senate, February 15, 1979, U. S. Government Printing Office.

A scientific paper based on these studies has also been submitted to a professional journal.