ON SUBARACHNOID BLEEDING—AN APPRAISAL OF TREATMENT

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Acute bleeding within the subarachnoid space is not an infrequent clinical finding. The symptomatology, signs and variations, depending on degree and rate of bleeding, associated damage to central nervous system, and presence or not of coexistent disease processes, are well known and have been thoroughly described in the literature.\textsuperscript{10, 28, 36, 37} In a small proportion of cases, the bleeding is associated with blood dyscrasias, infected emboli, neoplasms, or other unusual causes. In more, it is produced by actual external trauma. All these, however, may well be excluded in considering the main problem of "spontaneous subarachnoid hemorrhage."

It has long been recognized that apoplexy, with subsequent rupture of a "primary" intracerebral hemorrhage into the ventricular system or subarachnoid space, accounts for many cases within the group. Such hemorrhage, deep or relatively superficial, may occur in cerebral hemispheres, brain stem, or cerebellum. Though actively studied by numerous pathologists over the years, it must be admitted that the nature of the underlying vascular defect, in most instances, still remains obscure. During the last few decades, however, it has been increasingly emphasized that arterial aneurysms, arteriovenous malformations, or angiomata, by direct rupture account for many cases of spontaneous subarachnoid bleeding.\textsuperscript{9, 28, 29, 34, 36, 37} Signs of cerebral damage, present in more than half of these, are caused by concomitant intracerebral hematoma or ischemia.\textsuperscript{21, 25, 28, 29} There is, thus, a mixed group presenting with spontaneous subarachnoid hemorrhage in which, in many instances, the clinical picture does not permit differentiation of cause. Within this group, the relative incidence of arteriovenous malformations or angiomata may, with reasonable justification, be assumed to lie between 5 and 10 per cent.\textsuperscript{91, 25, 31} Anatomical recognition of arterial aneurysms may, however, be difficult or impossible, even at autopsy. Accordingly, the ratio between them and "primary intracerebral hemorrhage" is far less apparent. It has, however, been estimated at 2:1 by Timberlake and Kubik.\textsuperscript{38} It would probably be generally agreed that this forms a reasonable approximation.

Likewise, the natural course of the whole group during the acute stage has not been delineated with any degree of certainty. Several large series, however, reported in recent years, have indicated that, of patients thought to have bled from arterial aneurysms, the initial mortality rate lies between 35 and 50 per cent.\textsuperscript{16, 22, 28, 41} With primary intracerebral hemorrhage, the mortality is higher.\textsuperscript{1} The incidence of death with subarachnoid bleeding from
the various arteriovenous malformations is unknown. There is, therefore, no really accurate yardstick, even in terms of immediate mortality rate, for assessing efficacy of treatment in this whole composite group. A still more evident gap lies in knowledge of the incidence of later recurrent bleeding amongst survivors from the initial hemorrhage regardless of its cause. Indeed, though somewhat higher rates of recurrence have been reported elsewhere, the only really satisfactory long-term follow-up report appears to be that of Hyland. He stated that, amongst survivors presumed to have arterial aneurysms, some 20 per cent bled again at a later date. This figure is in keeping with that reported by Hamby.

These uncertainties regarding the natural history of spontaneous subarachnoid bleeding have taken on added importance during the past few years when cerebral angiography (Moniz) has made possible the recognition during life of a considerable proportion of the aneurysms, arteriovenous malformations, and angiomata. Such recognition has rendered feasible and reasonable a surgical attack on the source of bleeding, be it arterial aneurysm, arteriovenous abnormality, or angioma. Indeed, since the early reports of Dandy there have been numerous communications in the literature considering some aspect or other of the surgical treatment of subarachnoid bleeding. Unfortunately, some authors have limited their descriptions and selection to proven aneurysms and have neglected the important question of whether or not there has been bleeding; and, if so, exactly when. Others have drained hematomata and reported mortality rates ranging from virtually nil to almost 100 per cent. Operative approaches have been described in detail with frequently no information on over-all mortality rate or postoperative disabilities encountered. Indeed, with the exception of the report by Norlén and Olivecrona, it has been difficult for the physician to ascertain just what is the operative mortality, and the disability to be anticipated, in this form of surgery whether undertaken at some short interval after bleeding or even as an elective procedure.

It seems apparent, therefore, that neither is the natural history of spontaneous subarachnoid bleeding adequately known, nor are there yet available adequate surgical results to allow reasonable comparison between that form of therapy and conservative care. Ideally, such information should be sought only from a statistically planned study, rigidly organized in advance. By nature of the material, however, the many variable factors, and the relatively small number of cases available during a reasonable period of time, it seems improbable that such will ever be feasible. The pertinent information, in fact, may come only from accumulation of many retrospective, but unselected, comparative series. It was to initiate such a compilation that the present analysis was undertaken.

MATERIAL

This small survey analyzes the first hospital course of 235 patients with proven subarachnoid bleeding who were admitted to The Johns Hopkins Hospital during the years 1947–1954. This period was chosen since methods