On the Surgical Management of Encapsulated Subdural Hematoma

A Comparison of the Results of Membranectomy and Simple Evacuation

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That there is no unanimity of opinion regarding the preferred surgical management of encapsulated subdural hematoma is quite evident, even in the most recent literature on the subject. Rosenbluth and associates, in a recent article on the current management of subdural hematoma, advocated removal of the inner and as much of the outer membrane as can be reached through a 2-inch trephine opening. Sherman and Fromm emphasized that care must be taken to remove the inner membrane as completely as possible. Arutyunov, Gorbatschew and Shustins, and Umbachs were particularly insistent that all capsular parts of the hematoma be removed. Parkinson and Chochinov reported on 40 cases of subdural hematoma and had performed craniotomy and membranectomy in all of the 33 chronic cases. Gomez, in a review of 100 cases of subdural hematoma, of which 55 were chronic, noted that osteoplastic craniotomy may be necessary to allow for re-expansion of the brain if thick membranes are present. Many others have indicated that simple evacuation through burr holes or trephine openings is adequate, with resort to removal of membrane only if the brain fails to re-expand. Taarnhøj advocated simple drainage via trephine, noting that, even when craniotomy was accomplished, the amount of membrane removed did not seem to be a factor in recovery. Robinson stated that there was "no value in raising an osteoplastic flap, and it may be detrimental."

In an effort to determine whether or not simple evacuation of hematoma without membranectomy was in any way inimical to full recovery or resulted in any continued deleterious effect, or conversely, whether or not membranectomy yielded more satisfactory over-all end results, we have studied a rather selected group of patients.

Selection of Patients

From a total of 93 cases of encapsulated subdural hematoma treated at the Mayo Clinic from 1955 through 1960, 24 cases were excluded because of failure to meet the criteria established for this study. In an effort to minimize the influence of any associated brain injury caused by trauma, all patients with roentgenologic evidence of skull fracture, with severe associated injuries, or with a history of unconsciousness of more than 5 minutes were excluded. No cases were included unless a specific declaration was made on either the operative report or in the progress notes as to the presence of well-advanced formation of membrane, regardless of whether this could be inferred either from the history or the operative report. All cases of chronic subdural hematoma in infants were excluded.

A brief summary of some of the preoperative findings, symptoms, and other statistics is included primarily to give a better understanding of the composition of this selected group, rather than as a basis for comparison with others reported in the literature. In reports, dealing with this lesion, males are involved more frequently than are females (ratio, 3:1), with ages ranging from 6 to 75 years (average, about 50 years) and with most in the fourth through the seventh
decade of life. Some history of trauma can be elicited in 65 to 75 per cent of cases and the trauma-to-operation or symptom-to-operation interval varies from 10 days to 1 year, averaging between 4 and 7 weeks. Headache is a complaint in from 85 to 95 per cent of cases, and papilledema is present in 8 to 18 per cent, usually occurring in the younger patients. Subdural hematoma is bilateral in from 14 to 30 per cent of reported cases, the usual value being about 20 per cent. Preoperative seizures are reported in a wide variation between 4 and 38 per cent. Skull fracture has been found in as high as 13 per cent of one series.\(^{19}\) The reported surgical mortality rate has varied between 2.5 and 43 per cent, most commonly between 20 and 30 per cent.

In this study, of the 69 patients with encapsulated subdural hematoma, 51 were male and 18, female. Their ages ranged from 8 to 75 years with 53 more than 50 years old (77 per cent) and 13 more than 70 years old. Of the 16 patients less than 50 years old, 7 were between 40 and 50 years old and only 7 were under age 20 years. Thus, this group, with an average age of 63 years, is rather older than that usually reported, and this would be in keeping with the purposeful exclusion of the more severely traumatized who would tend to predominate in the younger and middle years of life. A history of head trauma was elicited in 42 cases (61 per cent); in 14 of these, it was regarded as minimal or of questionable significance and 13 had a definite history of head trauma but not of sufficient severity to produce unconsciousness. In only 15 of the 42 cases of trauma had there been an interval of unconsciousness, but it never exceeded 5 minutes in duration and most commonly was described in seconds rather than in minutes.

The symptom-to-operation interval for those patients with no history of trauma ranged from 7 days to 1 year, although 74 per cent were symptomatic for 1 or more months prior to operation, and only 4 came to operation in less than 2 weeks following the onset of symptoms. Of those with a history of trauma, the trauma-to-operation interval showed an extreme variation: from 10 days to 5 years. Only 2 patients had a trauma-to-operation interval of less than 2 weeks, 10 had intervals of from 2 to 4 weeks, and the remainder (71 per cent) had a trauma-to-operation interval of at least 1 month. The causal relationship of head trauma sustained 1 or more years prior to operation certainly is suspect since the 4 patients who gave trauma-to-operation intervals of 5, 4, 2, and 1 years had symptom-to-operation intervals of 30, 39, 28, and 30 days, respectively.

As shown by Munro and Merritt\(^ {14}\) and by Christensen,\(^3\) formation of membrane begins in the first 2 to 24 hours with a deposition of fibrin which is invaded by fibroblasts within 36 hours, these forming a layer three to four cells deep by the end of 4 days. Between 5 to 8 days later, a macroscopically visible membrane is present. By the 13th to 17th day, an inner membrane begins to form and, between 18 and 26 days, the subdural collection of fluid is surrounded by a thick outer and a thin inner membrane. Thus, in all cases in this report, a significant degree of formation of membrane could be expected and this proved to be the case at operation.

Headache was a symptom in 90 per cent of the patients in this study. Papilledema, present in 20 per cent, was a common finding in those less than 20 (70 per cent) and uncommon in those more than 50 years old (11 per cent). Equally interesting is the observation that 10 of the 11 patients with bilateral hematoma were more than 50 years old, the youngest being 45 and the oldest 75 years old. Papilledema was present in only 27 per cent of those with bilateral hematoma.

In each case, surgical treatment consisted initially of either evacuation of clot through burr holes with, in general, no attempt at removal of the membrane, or of craniotomy with removal of as much of the membrane as it was feasible to detach. Fifty patients were treated by the former method; the remaining 19 patients were treated by the latter procedure.