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Subarachnoid Haemorrhage - An Autopsy Study of 158 Cases

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Abstract

Subarachnoid haemorrhage and aneurysms are believed to be rare in India. A review of the Indian literature reveals no large-scale autopsy studies of subarachnoid haemorrhage. The authors have made a retrospective analysis of 1538 consentive cranial autopsies done over a period of 7 years. Macroscopic subarachnoid haemorrhage was identified in 158 (10%) cases. Among these ruptured aneurysms were seen in 33 (21%), arteriovenous malformations in 10 (6%), intracerebral haemotoma in 73 (46%) and cortical venous thrombosis in 8.2%. No cause was found for the subarachnoid haemorrhage in 9(5.5%) despite a detailed pathological study.

Key words -
Subarachnoid Haemorrhage,
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Studies of subarachnoid haemorrhage (SAH) from India have mostly focussed in its clinical and radiological aspects [1], [2], [3], [4], [5]. With the advent of new diagnostic techniques and increased awareness of therapeutic possibilities, the number of patients seeking admission to hospital for SAH has increased. Dalal [6] in his study on all cerebrovascular disease from Bombay, dealt with some of the acetiological factors responsible for SAH, in his case material. Limited

information on the incidence of SAH and lesions responsible for it were recorded in ICMR study [5] based on random medico legal and pathological autopsies. As a detailed postmortem study of cases with definite SAH is likely to provide a more realistic data on its aetiopathogenesis, this study was undertaken. The aim was to look into the incidence of the lesions producing SAH in our Institute and correlate the clinical and autopsy diagnosis.

Material and Methods

A total of 1538 cranial autopsies were performed during the seven year period from 1977-1983 as the National Institute of Mental Health & Neuro Sciences, Bangalore - 560 029, excluding the cases of accidental head trauma. The criterion used for the selection of the cases was the presence of macroscopically visible SAH irrespective of its extent in patients who died of neurological disease or neurological complication of a systemic disease. Cases with SAH due to surgery were excluded.

One hundred and fifty eight cases (10%) were found to have macroscopic evidence of SAH. These brains were fixed in 10% neutral formalin for one month or more and were examined. The dural sinuses, the superficial and deep venous systems were examined for the evidence of thrombosis. The arterial system was dissected out and studied for the evidence of aneurysm, atherosclerosis, thromboembolism and arteriovenous malformations (AVM). Serial coronal slices of the brain were made to look for intraventricular haemorrhage and for other lesions that might have caused SAH. Multiple histological sections from various sites including the edge of intracerebral haematomas were examined. for pathological evaluation. The clinical case records of these 158 patients were reviewed.

Observations

One hundred and fifty eight (10%) out of 1538 autopsies had evidence of macroscopic SAH of varying degree. There were 98 (62%) males and 60 (38%) females. Among these 40 (25%) had arterial hypertension. The variety of lesions responsible for SAH is shown in Table I.

Table I - Aetiology of SAH in autopsied cases

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Ruptured aneurysms were seen in 21% and AVM in 6%. Primary intracerebral haemorrhage with secondary SAH was the commonest cause, seen in 73 (46%) cases. 35 patients with intracerebral haematoma were known hypertensives. However in the remaining 38 patients of this group no cause for the haematoma was detected and hence considered idiopathic in origin. Cortical venous thrombosis (CVT) was seen in 8.2%. The less common causes were arterial thrombo-embolism, pyogenic meningitis, tuberculosis meningitis, viral encephalitis, bleeding disorders and tumours. The cause for SAH could not be found in 9 cases (5.5%) even after detailed pathological study. Ninety (57%) cases showed varying degree of intraventricular haemorrhage (IVH) (Table II). Interestingly in 4, no cause for the IVH could be detected.

Table II - Intraventricular haemorrhage causes

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(n=Total number of cases with IVH)

Comparing the clinical and autopsy diagnosis in each case it was found that the cause of SAH was correctly diagnosed prior to death in 110 patients (69.6%) based on clinical features and investigations, while in 48 (30.4%) it could not be detected before death. These 48 patients had presented with sudden onset of severe headache and examination revealed neck stiffness and clouding of sensorium. Lumbar puncture had shown SAH in these patients. They did not have lateralising deficits and they could not be investigated due to early mortality. The cause for SAH in these 48 patients is also shown in Table I; the largest group was again intracerebral haematoma (44%); aneurysms were responsible for 29% and CVT for 6%. In 5 cases even after detailed pathological study in this group the cause of SAH could not be found.

Discussion

A large number of causes have been found responsible for non-traumatic SAH and a great amount of information is available from the West [7], [8], [9], [10], [11]. Most of these workers, except Courville [12] found intracranial aneurysm as the most frequent identifiable cause for spontaneous SAH. Courville [12] in his 596 cases of nontraumatic SAH found that 40.1% of cases were secondary to hypertension and artherosclerosis, 17.8% due to ruptured intracranial aneurysm and in 11.8% no identifiable cause could be detected. In a co-operative study of Locksley [9], where 6368 cases were examined by angiography and autopsy, intracranial aneurysm was found to be the most important aetiological agent responsible accounting for 51%, followed by 15% of hypertensive cerebrovascular disease, 6% AVM, 6% miscellaneous causes and in 22% no cause was detected. In all these studies the clinical, radiological and autopsy data were computed together. The study from the Pathological Institute and Medical Academy of Erfurt [13] was similar to the present study in that all patients with SAH identified at autopsy were included. The results from Erfurt and those of the present study are compared in Table III. The incidence of aneurysm is comparable in both the studies. The data presented in the present study is biased for two reasons, firstly only the fatal cases are analysed and secondly, the material comes from a specialised neuroscience centre and not from a general hospital like in the case of ICMR multicentric study [5], another important study from India. Similarly, in the second part of ICMR multicentric study, random medicolegal and pathological autopsies were analysed for the incidence and aetiology of sub-arachnoid haemorrhage and they did not correspond to the cases investigated clinically in the first part. On the other hand, we have analysed both the clinical and pathological aspects in the same group of patients. In view of these variations in the selection, the present study is not comparable to the ICMR study, to draw general conclusions. Though this incidence cannot be extrapolated to the population, the figures indicate that aneurysms are at least not uncommon in India as was indicated by the previous studies [2], [3], [14]. Similarly Banerjee [15] from Chandigarh noted 9 cases of ruptured aneurysms in 200 consecutive brain autopsies and 6 more in 174 brains examined in one year subsequently [5]. ICMR sponsored epidemiological study on SAH in India has also lead to the conclusion "once the diagnosis of spontaneous SAH has been established and the patients were fully investigated, the incidence of sacular aneurysm as the aetiological factor is not significantly different from elsewhere in the world [5]".

Table II - Causes of subarachnoid haemorrhage

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It is striking that while in the clinical studies, aneurysm is the commonest cause of SAH, in the autopsy studies intracerebral haematoma with secondary SAH is the commonest cause. As is evident from Table II, even among those who presented with the clinical picture of primary SAH, the autopsy revealed primary intracerebral haematoma and secondary SAH in 44% of the cases. This is consistent with the finding of McKissock and Paine [8] that the prognosis of SAH due to intracerebral haematoma is worse than that of aneurysmal SAH. In case of intraventricular haemorrhage also the commonest cause was intracerebral haematoma followed by ruptured aneurysm unlike in Pia's series [16] where angiomas and intracerebral haematomas predominate (Table II). Significant attention has not been paid to this entity during pre CT era. The relevance of this fact is that in patients who present with symptoms of primary subarachnoid haemorrhage, every effort must be made to rule out a primary intracerebal haematoma. This would necessitate a CT Scan in every patient with the clinical diagnosis of SAH. The CT Scan also would rule out simultaneously most of the other cases of SAH listed in Table I. It is worthwhile emphasising 8.2% incidence of cortical venous thrombosis as a cause of SAH. This lesion was found more frequently in females during puerperal period in South India, and is uncommon in the West.

In a clinical study of SAH from our Institute [17] it was found that in 57.4% of 355 cases the cause of SAH could not be detected. However in the present autopsy study a cause was found for all except 9 cases (5.5%). The reasons for this difference may be:

(a) Aneurysms and AVM's might have escaped detection [18];

(b) some of the cases dying with a clinical diagnosis of primary SAH might have in fact had an intracer [17]

(c) The prognosis of SAH is better if angiography shows no lesions [18], [19].

It is to be reiterated that the exact incidence of a disease can be gauged only through a population based epidemological study. A recent example is the New Zealand study [20], where, by examining the trends in SAH mortality and morbidity from routinely available information from 1959 to 1979, a definite decline in incidence of SAH related mortality since mid 1970, especially in women, was noted. The case fatality rates have remained stable at about 42% for the 20 year period under review [20]. Similarly in another study [21] from New Zealand SAH due to aneurysmal rupture was found to be low in Maori (Indian and Chinese) population. A prospective study measuring the incidence, case fatality, management and risk factors would help us to understand the etiology and the effect of shifting trends in management with advances in diagnosis of SAH is being made more often now than two decades ago a cooperative multicentric study of SAH is warranted now from India. The prospective study needs to be done at different centres (both clinical and pathological) using uniform selection criteria in clinical, radiological and pathological aspects. In the first place, it is essential to keep the bias and include the cases from the neurology and neurosurgery services for the sake of uniformity in clinical assessment, investigation, management and grading of the outcome, with a clear understanding that this cannot be treated as an epidemiological study in true sense. In the second phase, similar information could be obtained from other general hospitals as well with a strict selection criteria, to obtain a realistic picture in general population.

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