Intracranial Aneurysm History

The study of intracranial aneurysms has grown at an astounding rate since Sir Charles Symonds association of hemorrhage within the subarachnoid space to intracranial aneurysms in 1923.

The need to secure unstable intracranial aneurysms was identified by Harvey Williams Cushing (1923) [1)]

The first surgical treatment of an intracranial aneurysm with wrapping was made by Norman McOmish Dott in 1931 [2)] , but the first modern-era clipping procedure was performed by Walter Edward Dandy in 1937 [3)]. Since then, the progressive evolution of devices, particularly the operating microscope, has resulted in intracranial surgery to secure aneurysms presenting with subarachnoid hemorrhage, or otherwise, becoming routine procedure.

The latest era of aneurysm treatment has seen the meteoric rise and acceptance of neuroendovascular treatment by interventional radiologists. Endosaccular obliteration by insertion of silver wire was first reported in 1941 [4)]. During the 1970s and 1980s, the evolution of catheters and detachable devices, most importantly metal coils, resulted in the ability to secure intracranial aneurysms without the need for operative trauma or dissection to the brain. However, even the earliest studies of modern coiling techniques pointed towards some limitations of these techniques and suggested that some aneurysms might be more challenging or unsuitable for endovascular therapy [5)] These difficulties were partially addressed over the 1990s by development of balloon assisted coiling and stent assisted coiling techniques.

One of the most impressive studies on the outcomes of the two treatments for intracranial aneurysms, the International Subarachnoid Aneurysm Trial (ISAT) was presented in 2002 [6)]. It suggested that the ruptured intracranial aneurysm treated endovascularly had a better one-year outcome, maintained at seven years, in terms of neurodisability and seizures. An increased risk of delayed rebleeding compared with the aneurysm treated surgically was seen. The practice of radiological follow up to identify the possible recurrence was encouraged, and rates of prophylactic retreatment following endovascular therapy were noted to be higher that for open surgery.

In parallel with these developments, advances in both the resolution and availability of neuroimaging modalities have led to an increased number of patients presenting with aneurysms that are considered asymptomatic. Epidemiological data have become accepted that offer year-on-year risk stratification of the risks of subarachnoid hemorrhage from such aneurysms [7)]. The modern neurosurgeon or neurologist is hence routinely asked to consider treatments for the unruptured, asymptomatic aneurysm, in addition to the emergency workload of those presenting with subarachnoid hemorrhage. The patient group over time has become younger, healthier, and better informed prior to presentation. Particularly those patients that present with an unruptured aneurysm after screening following the subarachnoid hemorrhage of a close relative may have strong psychological factors influencing their decisions to have treatment or not. They may be very keen to avoid the need for long-term follow up and eliminate worry. For these patients the issues of retreatment are very serious. For the experienced vascular neurosurgeon the operative conditions in the context of unruptured aneurysms are ideal and operative morbidities should be minimal. These factors, coupled with the recognition of the key differences not only in presentation but also in treatment goal, often combine to make surgical treatment of the unruptured aneurysm a preferable option [8)].

Previous data from previous studies such as ISAT is difficult to apply to newer cohorts of patients. We

now see a different patient group requiring aneurysm surgery. They have progressed from those presenting acutely in various states of disability, to a group that includes fewer such patients, but a greater proportion of recurrent or residual aneurysms post-coiling, and the unruptured group requiring treatment with the highest definitive success rate. Only further longitudinal studies of these newer groups of patients will guide us in time as to the precise outcomes [9].

References

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