Collagen sponge for surface brain protection

Technical note

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The authors discuss the properties, use, and advantages of collagen sponge as a microneurosurgical adjunct. Experience with the material in over 300 operative cases has demonstrated its value for protecting the surface of the brain during exposure and retraction in neurosurgical procedures.

KEY WORDS • collagen sponge • brain protection • retraction

INTRACRANIAL procedures frequently require prolonged retraction of the brain. Because of the brain masses involved, the uncertainty of permissible retractor pressure, and the limited access of assistant surgeons to the field, a system of self-retaining retraction is preferable. Adjustment of these retractors during microneurosurgery is a difficult but essential task. The surgeon must observe the condition of the exposed brain surfaces remote from his limited microscopic field. The increased possibility of brain drying, abrasion, or laceration is a cause for concern. The limitations of conventional materials in solving this problem are appreciated by most neurosurgeons. Portnoy and Croissant suggested the application of a silicone sleeve to the retractor blade. This is a valuable technique, but it does little to buffer the pressure between the hard retractor blade and the soft brain, prevent drying, and absorb the occasional minor but annoying bleeding of extradural and extracranial origin.

During the past 2 years, we have had extensive experience with collagen sponge as a protective adjunct during retractor application and believe that it is superior to materials and techniques in current use.

Material and Methods

Collagen sponge (Biocol)* was originally produced as a material to improve upon hemostatic gelfoam. It is a soft, white, pliable material with excellent wet strength. Because of its fibrous structure, the collagen sponge does not crumble when handled. As opposed to the standard gelatin sponge USP, which absorbs about 30 times its weight in fluid, the collagen sponge can rapidly absorb about 100 times its weight in aqueous fluid. This offers a particular advantage as a moistening agent during prolonged periods of application, and explains why the substance is highly pliable (Fig. 1), and has a resistance similar to that of

*Biocol is manufactured by Codman and Shurtleff, Inc., Randolph, Massachusetts 02368.
Fig. 1. Application of the moistened material to the base of a brain model demonstrates pliable nature of the substance.

Fig. 2. Initial application of material to brain surface in accordion-pleated mode.

脑。其中一个表面非常光滑，因此材料一旦湿润就会滑过大脑表面而不会产生阻力。相反的表面具有足够的粗粒来提供对显微镜下刀片的摩擦力，从而便于操作。尽管其吸水能力很强，但却没有明显的体积变化。

Results

Since July, 1972, we have used collagen sponge as a protective adjunct in over 300 neurosurgical procedures at our medical center. Procedures have varied in length of operating time from 1 to 13 hours, with a wide range of exposures and surgical pathology. The wet strength, pliability, and resilience of the sponge were ideal. It handled easily and conformed readily to the surface to be protected. Most importantly, it provided no hazard with the use of the high-speed air drill. After completion of the most lengthy procedures, the material separated readily from the brain tissue, leaving a normal-appearing interface.

Reference


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