Diagnosis and Treatment of CHRONIC SUBDURAL HEMATOMA

ESSAY

Submitted For The Partial Fulfilment
of The Master Degree of Surgery

By

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M.B. B. ch.

Supervised By

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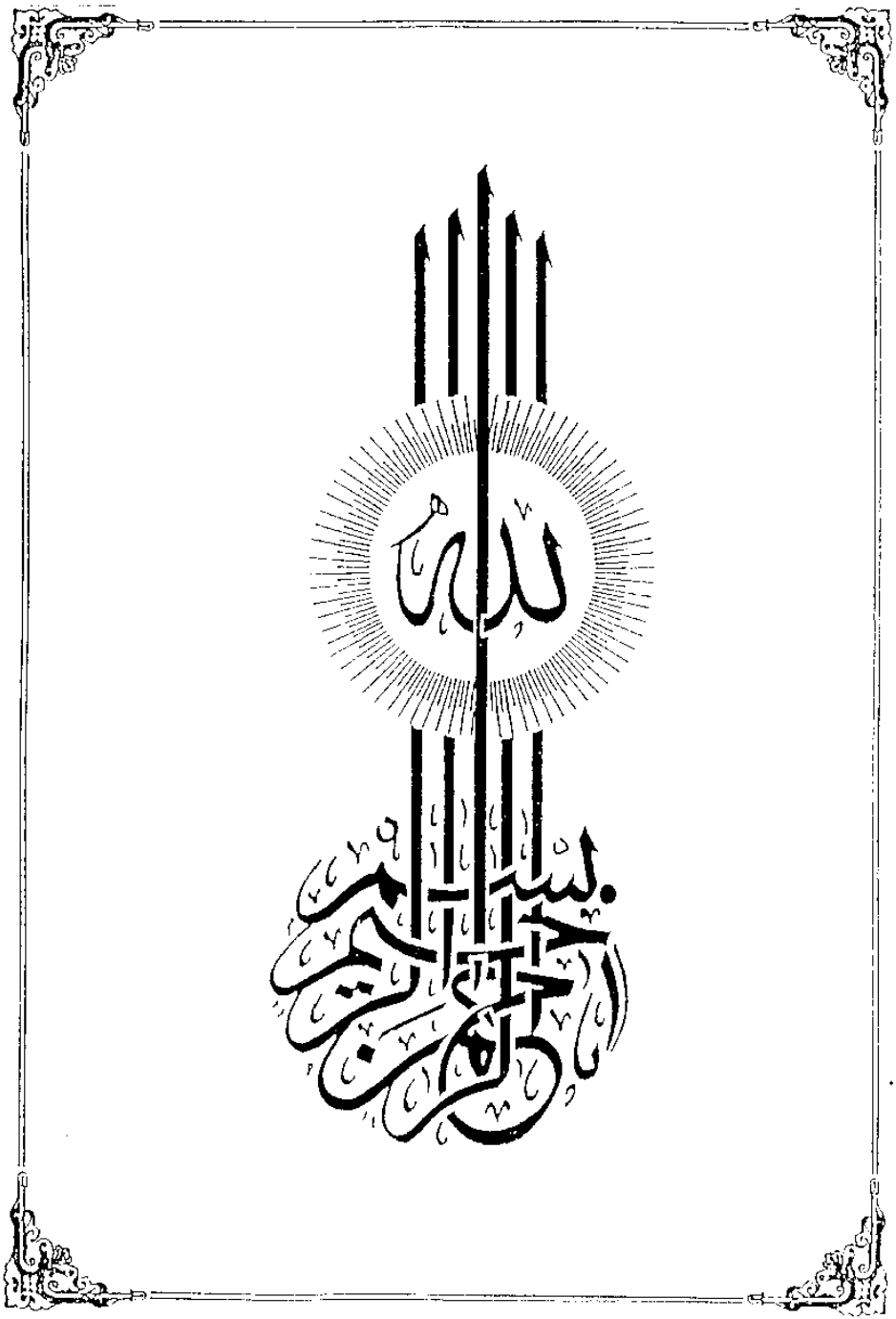

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Hedaia M.Hendam

CONTENTS

INTRODUCTION

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Chronic Subdural hematoma develops as a result of bleeding in the subdural space. (Poljokovic 1991). It occurs most frequently in the elderlypatients. (Cameron MM. 1978). It may occur during childhood with peak incidence at approximately 6 months of age (Mclaurin. Rl. 1985) common predisposing factors are alcoholism, Seizure disorders, cerebrospinal fluid shunt and anticoagulation (Fogelhom R. 1975). The symptoms and signs of chronic subdural hematoma are variable. (Fogelhom R. 1975). The diagnostic procedure 2of choice for chronic subdural hematoma is computed tomography scan. Computed tomography scan with contrast media or magnetic resonance imaging may be necessary to diagnose bilateral chronic subdural hematomas. (Wyble.S.W 1992).

The most frequently employed treatment of chronic Subdural hematoma has been evacuation(Mamo.L.cophignon 1982).

* Aim of the work.

. Review of pathological aspect, clinical picture, investigations and treatment of chronic subdural hematoma.

* Steps:-

. Anatomy.

. Pathology.

. Clinical Picture.

. Investigtions.

. Treatment.

. Summary.

. References.

. Arabic Summary.

ANATOMY

Anatomy of The Dura Mater

It is well known that the meninges consist of the pia mater, arachnoid mater and dura mater and that a well formed fluid containig compartment, the subarachnoid space (SAS), is, present between the pia and arachnoid., (Clemente.1987).

There are divergent opinions concerning whether a naturally occurring space, the so called "subdural space" is present or not at the dura- arachnoid junction-,(Adams et al 1989).

The concept of a naturally occurring space being extant between the arachnoid and dura was advocated in the studies of kety et al (1976).

The vast majority of basic scince texts, (Barr et al 1988) idenified a potential subdural space and suggest that it may contain small amounts of fluid.

Despite these deeply ingrained concepts early and more recent studies,(Fredrickson 1991), offer compelling evidence that the subdural space as classically defined, is not present in the meninges. Furthermore, the collective evidence clearly argues that the sequestring of fluid in this general area of the meninges may result after tissue damage, but is not simply the filling of a preexisting space, (Fredrickson,1991).

The anatomical points summarized below are purposefully brieff as they have been recenthy considered in greater detail.

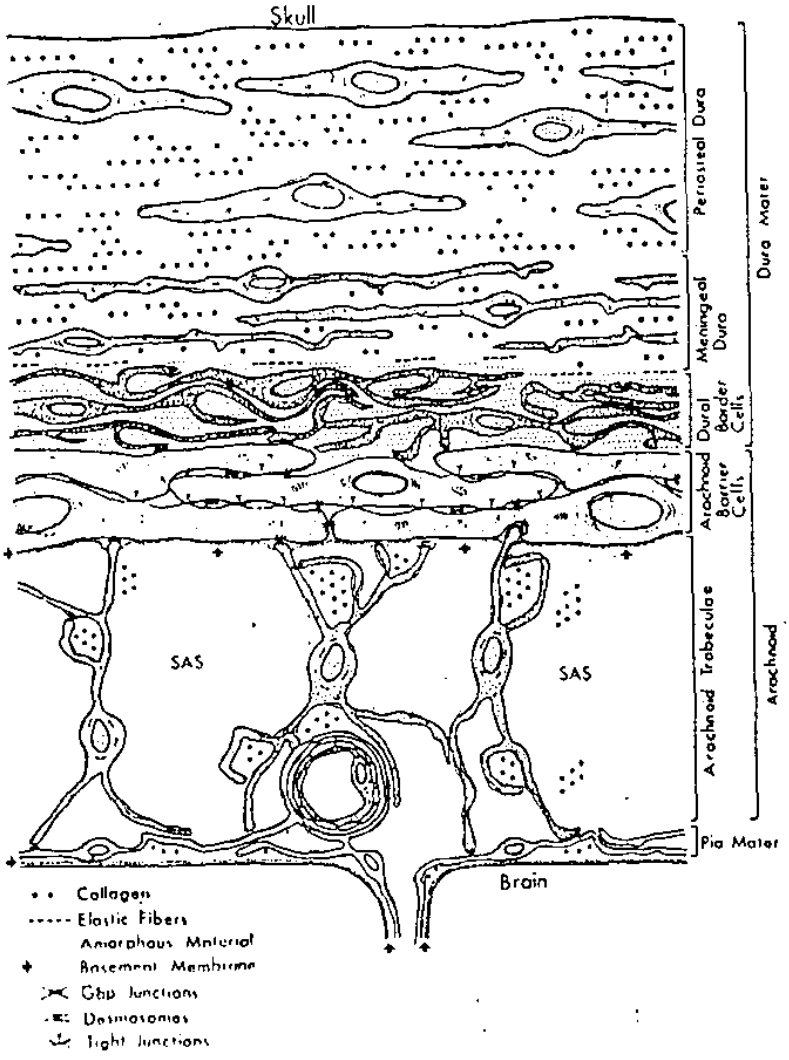
The Dura mater and Dural border cell layer:

The dura mater(FigI) is adherent to the skull, with attachments being particularly strong in the cranial base and along the suture lines, (Allen et al 1977). This membrane is composed of fibroblasts and extensive amount of extracellular collagen, the latter is oriented in a variety of directions,(Peters 1991).

Microfibrils and elastic fibres may also be present but in amount that are significantly less than that of collagen, (Schachenmary 1978).

The characteristic strength of the dura is a reflection of the large amounts of collagen found in this layer. Fibroblasts of the dura are elongated, somewhat flattened cells oriented parallel to the flat axis of the dura mater(FigI). They contain organelles that are characteristic of this particular cell type, such as large amount of granular endoplasmic reticulum Golgi apparatus, ribosomes, mitochondria, fat droplets, filaments, and some vesicles, (Nabeshima et al 1975).

The external or periosteal dura (FigI) is attached to the inner suface of the skull and contains nerve and blood vessels.



(Fig. 1). A semidiagrammatic representation of the structure of the meninges(based on electron microscopic data) from the inner surface of the skull (upper) to the external surface of the brain (lower). Collagen is present in the portion teal and meningeal dura (large dots, orlentation of fibrils not indicated) and in the subarachnoid space (SAS), usually in folds of trabecular cells the dural border cell layer has no extracellular collagen, few cell junctions, enlarged extracellular spaces (but no basement membrane), and fibroblasts that are distinct from those of the outer portions of the dura. The arachnoid barrier cell layer has essentially no extracellular space, numerous cell junctions, more plump appearing cells, and a comparatively continuous basement membrane on its surface toward the SAS. Note the continuity of cell layers from the arachnoid to the dura (no intervening space), the characteristic appearance of the arachnoid trabeculae, and the relationship of the pia. (from Haines DE: On the question of subdural space. Anat Rec 230:3-21, 1991.

In addition, this part of the dura has fewer fibroblasts and proportionally more, extracellular collagen, (Anderson 1969). In contrast, the inner or meningeal part of the dura (Fig I), has greater numbers of fibroblasts and proportionally less collagen, (Orlin et al 1991).

The large venous sinuses are located at points where the meningeal dura is reflected off the periostesl dura to form the meningeal reflections, (Haines et al 1991).

A unique population of elongated, flattened fibroblasts are present where, the inner aspect of the dura is contiguous with the arachnoid (Fig I). Where as Waggener et al (1967) described these fibroblasts as dural cells or bordering cells. The specific term dural border cells was coined by Nabeshima et al(1975).

Although dural border cell (DBC) is used, it is important to note that cells in the same location and of clearly comparable morphology have been called"Subdural cells", (Akashi 1972); the "Subdural mesothelium", (Alcolado et al 1988); light cells, (Frederickson 1991); neurothelium, (krisch et al 1983); the subdural compartment, (Orlin et al 1991) or deseribed as the outermost or superficial zone part of the arachnoid (Rascol et al 1976).

Fibroblasts of the DBC layer (Fig I) may extend for considerable distances parallel to flat axes of the meninges and

form a thick layer of several cell processes,(Yamashima et al 1984). In human material, these cells frequently appear sinuous or undulated and may interdigitate.

There are three important structural characteristics of the DBC layer. First, the extracellular collagen is lacking in this cell layer (Fig I). This is in sharp contrast to the large amount of collagen found in more external regions of the dura. Second, the irregular pattern of the processes of DBCs create extracellular spaces of various sizes and shapes within this cell layer. These extracellular spaces in the DBC layer contain no callagen but are filled by an amorphous, non filamentous material described as being granular, grainy fuzzy or flocculant, (Lopes et al 1974). The transition from DBC layer to meningeal dura is signaled by a decrease in the extracellular amorphous material of the DBC layer and a precipitous increase in collagen and elastic fibres may be present at this junctions. (Schachenmayr et al 1978). Third relatively few cell junctions are seen between DBCs (Fig I) when present, they usually appear to be desmosomes and occasional gap or intermediate junctions(Kepes 1982). Such as cell- to- cell connections are not seen between DBCs and fibroblasts of the meningeal dura but are occasionally present between DBCs and the arachnoid, (Andres 1967).

It is important to note that there is no evidence that tight junctions are present between DBCs and no evidence of flat

mesothelial like cells sitting on a basement membrane at the dura, arachnoid junction. Consequently, the morphological data do not support the view that a mesothelial lined cavity is found at this point in the meninges. Furthermore, the features of few cell junctions, no extracellular collagen, and enlarged extracellular spaces create a structurally weak cell layer in the vicinity of the dura-arachnoid interface.

Arachnoid mater:-

Internal to DBCs, there is a layer of cells whose close packing has largely excluded any significant amount of extracellular space(Fig I). Following the nomenclature of (Nabeshima et al 1975), these cells form the arachnoid barrier cell (ABC) layer. They are characterized by a more plump appearance, the presence of a full range of organelles, including a prominent Golgi apparatus, and numerous mitochondria and large oval shaped nuclei (Waggener et al 1967). In concert with the lack of appreciable extracellular space in the ABC layer and the lack of callagen is the presence of numerous cell junctions (Fig I). Desmosomes and light and gap junctions are espicially obvious and occasional hemidesmosomes or intermediate junctions may be seen; (Lopes et al 1974).

The presence of numerous tight junctions between ABCs layer is unique to this meningeal layer. The feature gives strength to the ABC layer and serves as a barrier against the movement of fluid,

large molecular weight substances, or even ions; (Van Rybroek et al 1982).

In addition to the numerous junctions found between ABCs, morphologically distinict cell contacts are also present in fewer numbers, between ABCs and DBCs; (Schachenmary et al 1979). Conseqently, the more tenacious ABC layer is externally continuous with the structurally weaker DBC layer (Fig I). Another important feature of the ABC layer is the presence of a basement membrane on its inner surface (towards SAS).

Pia mater:-

Flattened fibroblasts on the surface of the brain from the pia mater (Fig I). Pial cells characteristically have few organelles, comparatively translucent cytoplasm, few cell junctions and they may form a single layer, several layer or, on occasion, appear to be discontinuous on the brain surface; (Cragg 1976).

Krisch et al (1984) have suggested that the pia is more consistently organized into inner and outer layers that enclose a pial space, with the inner pial layer being separated from the brain surface by the subpial space. Abasement membrane is found between the surface of the brain and the overlying pia (Fig I).