MANAGEMENT OF POSTTRAUMATIC INTRACEREBRAL HEMATOMAS

ESSAY

Submitted for Partial Fulfillment
of the Master Degree in **General Surgery**

By

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بسم الله الرحمن الرحيم

"وقل رب زدني علما"

صدق الله العظيم

سورة طه / ١١٤

بسم الله الرحمن الرحيم

TO...

MY PARENTS

WHO SUFFERED A LOT FOR ME

AND

TO MY TEACHER

DR. MEDHAT MOSTAFA,

WHO TAUGHT ME HOW TO BE A

KIND DOCTOR

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INTRODUCTION AND AIM OF THE WORK

Posttraumatic intracerebral hematomas are probably due to direct rupture of intrinsic vessels. The mortality rate shows no correlation with location *(Crooks, 1991)*. Intracerebro-ventricular hemorrhages were found in cases of severe craniocerebral trauma complicated as a rule, with skull bone fractures, pollar-basal contusional foci and intracerebral (rarely meningeal) hematomas *(Lebedev et al., 1989)*.

Posttraumatic intracerebral hematomas were apt to occur in middle aged or eldrely patients and more delayed cases increased in patients of 60 or older *(Okada, 1989)*. The times when the formation of trumatic intracerebral hematomas were judged as completed showed two peaks, within 6 hours after the trauma and 12 to 24 hours after the trauma *(Okada, 1989)*.

Because of the ease of performing and interpreting computed tomography and the difficulty in performing magnetic resonance imaging in acutely injured patients on life support system, the former is currently preferred for the evaluation of acute head injury on admission *(Deck and Weingarten, 1990)*. In patients with posttraumatic neurological sequelae, magnetic resonance imaging is preferred to computed tomography for evaluation of cerebral contusions, shearing injuries and small extracerebral hematomas. After 3 days of trauma, magnetic resonance imaging is superior to computed tomography in detecting all intracerebral hemorrhagic lesions and should be the primary procedure, with computed tomography playing an adjunctive role *(Deck and Weingarten, 1990)*.

The magnetic resonance characteristics of intracranial hemorrhage are the result of complex phenomena that cause rapid and dramatic changes in signal intensities on sequential magnetic resonance scans. These changes are dependent on multiple intrinsic and extrinsic (equipment-oriented) factors *(Deck et al., 1990)*. Posttraumatic intracerebral hematomas are a common neurosurgical emergency; their management, particularly the role of surgical removal, is controversial. Deterioration often occurs late and is unpredictable *(Choksey et al., 1997)*.

Aim of the work

Review of pathophysiological aspect, clinical picture and management of posttraumatic intracerebral hematomas.

ANATOMY

ANATOMY AND DEVELOPMENT OF CEREBRAL BLOOD VESSELS

I. Embryogenesis of the vascular configuration of the cerebral cortex:

The surface of the telencephalic vesicle is still completely smooth in the fourth month of intrauterine life, except for the shallow depression of the insular region.

The blood vessels follow quite regular courses: The arteries form a fan of rectilinear branches which dichotomize progressively, fine branches penetrate into the parenchyma and anchor the fan to the surface. Starting in the fifth month, differential growth of the various cortical regions bring about the formation of sulci and gyri. The vessels follow the surface and, as a sulcus deepens between two gyri, the arteries vanish into its depth as they cross it. In other words, cortical infolding deforms the previously regular vascular pattern. Arriving at the edge of the sulcus, an artery plunges to the bottom of it, rising up on the opposite lip to reappear on the free surface of the next gyrus *(Szikla et al., 1977)(Fig.1)*

2. The deep vascular pattern: Sulcal vascular laminae: One can distinguish the descending from the ascending part of

Fig. (3): Angiographic appearance of deep vascular segments.
(a) Loop of ascending branch in the inferior frontal sulcus (b) Loop in posterior intraparietal sulcus (c) Terminal loops of arterial branches coming from behind and before into the upper precentral sulcus (d) Branch crossing the central sulcus (e) Temporal branch coming from sylvian fissure (f) Branch of anterior cerebral artery (g) Superficial ... descending in rolandic region
sfa sulcus frontalis anterior, ip sulcus interparietalis, Pre sulcus precentralis, cent sulcus centralis, tss sulcus temporalis superior, fs sulcus frontalis superior (G. Vaikla, 1977).

the invaginated segment as it enters and exits the sulcus, crossing its two opposite lips in turn.

The obliqueness of descent and ascent will naturally depend on the angle between the original arterial course and the direction of the sulcus. A perpendicular intersection will lead to the formation of a U-shaped loop. For example, such U-loops are formed at the level of the inferior frontal sulcus, placed at a right angle to the paths of the sylvian branches between the sylvian fissure and the middle frontal gyrus, where these branches terminate.

If the artery traverses the sulcus obliquely, its descent and ascent are stretched out over a certain length; such is the case at the level of Rolando's sulcus, where the entry and exit of an artery may be separated by several centimeters. Such deep segments will naturally have an elongated form for which the term "loop" no longer seems correct. For this reason the terms "deep segment" or "intrasulcal segment" seem more accurate.

The vascular elements hidden in the sulci constitute the "deep pattern", as opposed to the "superficial pattern" summing up the vascular segments visible on the surfaces of the intact hemispheres. Major arteries often cross several sulci, which [illegible] segments in the course of a single artery.

Moreover, an artery running in the depth of one sulcus may enter the depth of another communicating with the first without reappearing on the free surface, as seen for instance at the level of the precentral sulcus, which communicates with the depth of the frontal sulci. These simple observations imply that the relationship of arteries to sulci is not one-to-one: an artery does not correspond to a single sulcus, but to several. Conversely, a distant sulcus is traversed by and contains the deep segments of several arteries.

The cortical veins have a different relationship to the sulci. Situated closer to the dura mater, draining into its sinuses, the larger veins do not adhere as closely to the cortical surface. However, between the parenchyma and the layer of large superficial veins, also run within the sulci, many of them perpendicular to the free surface ([illegible], 1977, Fig. [illegible]).

I. Anterior interhemispheric surface:

The vascular configuration, especially the arterial, reveals the anatomy of inter hemispheric surface. The sulcus of corpus callosum is shallow and usually has no large arterial branch in