7

Laboratoire de Physiologie et de Biomecanique
Association Peugeot Renault

CLASSIFICATION OF CRANIO-ENCEPHALIC LESIONS

by C. Tarriere
and C. Got

Difficulties involved herewith are as follows:

- There is no close correspondence between skull lesions and lesions of the brain.
- Importance of secondary lesions which may completely mask the initial lesions produced by the insult, and this on a clinical as well as on an anatomical level. Example: Differentiation between micro-hemorrhages of the brain-stem due to trauma or by a subsequent engagement to a cerebral edema.
- Existence of severe lesions whose prognosis and severity is not proportional to the intensity of the insult as expressed in currently measured physical parameters. Example: Sub- or extradural hematoma.
- The indirect nature of clinical classification, the lesion being observed through the medium of a functional disturbance and rarely directly, as one may see the fracture of a limb.

So, attempts to classify traumatic lesions must take into consideration these different factors. This leads to:

I. Ability to distinguish between lesions for which a correlation with the currently measured physical characteristics of the insult can be made and those which do not permit such a correlation (mainly hematomas).

II. Ability to distinguish, within the group of lesions for which a good correlation with the measured physical aspects of the shock may be expected

A. Survival cases where it is possible to single out:

1. Injuries without skull fracture, their description being necessarily only clinical and based on such primary observations as:

- the duration of the loss of vital functions of communication and the extent of the damage to vital functions,
- possible signs of lesion localization,
- possible signs of cerebral edema.

The main difficulty in the identification of lesions in this group will always be associated with problems in separating these primary signs from those belonging to secondary complications. This applies even to an injury person who is prematurely seen. Example: difficulty to distinguish the following two sequences:

a. Trauma loss of consciousness without major neurological lesion
hypoxia connected with vomiting, and/or buco-pharyngeal aspirated hemorrhage
prolonged coma with secondary CNS lesions/secondary to anoxia

b. Trauma Prolonged coma due to direct mechanical lesions of the central nervous system

2. Injuries involving skull fracture which require:

a. the same classification for signs of central nervous system damage as the preceding group

b. a complete description of the fracture and the point of application of forces which produced it in order to distinguish:
   - localized fractures and penetration due to intense local loading
   - fractures with extension of the crack lines away from the point of impact
   - indirect fractures (lines located at a distance from the point of application of forces), example: the circular fracture of the base of the skull after an impact on the chin.

B. Fatalities and autopsy examination which permit

1. A description of lesions of the CNS with the effort to separate primary lesions directly resulting from the insult from secondary lesions caused by complications.

2. A description of fractures as for the preceding group.

Such regroupings would permit

- better estimate of risk by studying statistical groupings of the same classification,
- further knowledge about human tolerance by making a clean cut separation between a) what is primary and secondary in CNS damage, b) primary lesions which correspond to the measured physical characteristics of the insult, from those which do not.

Chances for studies within this latter group would require particularly suitable cases for physical access to the problem.

- further, various deaths of non-neurological origin allowing for morphological observation of lesions consistent with survival. Methods of examination of impacted surfaces being used to describe, in physical terms, the injury responsible for the lesions.

- various deaths of neurological origin which form an intermediate group between the preceding group and
- on the other hand, instantaneous deaths which permit observations of primary lesions free from sequelae.

The above described methods would, moreover, permit description of the physical characteristics of the shock.