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OBSERVATIONS UPON INJURIES OF THE HEAD.

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INTRODUCTORY REMARKS, DEFINITION OF TERMS, AND PROPOSED CLASSIFICATION OF THE FORMS OF INJURY.

The several points of management in the accidents to which the brain and its investments are exposed, are now so generally understood, that it would appear to a superficial observer as if no more remained to be said on the subject. They have claimed the attentive inquiry of some of the ablest surgeons of past and present times, and in the main have been well elucidated and clearly explained. Nevertheless, there yet remains something to be done; if we are rich in materials there is a want of systematic analysis in reference to the treatment of these injuries, without which it is impossible to generalize with safety or success.

The profession in this country have long been distinguished by a cautious observation of facts, and the difficulty of finding out the truth has led them to place a correct value upon its ultimate attainment. Hence they are as a body safer practitioners than many of their Continental neighbours, and I regard the management of head injury as forming no exception to this rule. Perhaps, too, we appreciate more justly the purpose and operation of medicines; certain agents, as mercury, are administered with greater boldness and effect, and I am inclined to think that a mischievous habit of anticipating the approach of possible symptoms or forms of diseased action, whether by mechanical interference or otherwise, is not at present to be numbered amongst the short comings of British surgery.

In certain treatises of a former time we read, it is true, of setting on the crown of a trephine, as a matter of course in obscure cases, or scalping the patient, as one of those mild preliminaries proper to the subsequent search for an assumed crack or fracture in the skull; but these things have passed away, and, perhaps, their mere rehearsal is uncalled for. Still the mind of a beginner is apt to be amazed and lost amidst the labyrinth of terms under which the various forms of head mischief are described, and there is an absence of simplicity even in their definition. Concussion, com-

motion, depression, compression, laceration, extravasation, are several words which, to a student, might seem to imply so many distinct species of disorder. Now, for any useful purpose of definition, they all resolve themselves into two classes or headings, viz.:—1. Commotion. 2. Compression. Surely, with a practical view, symptoms should be arranged according to their relation to the brain itself. Scalp injury belongs rather to the department of flesh wounds and their consequences.

No one who has had an opportunity of seeing much of these accidents can have failed to notice the great variety of symptoms which the same kind and amount of violence will produce in different individuals; indeed, any one who expects to realize the ordinarily-received symptoms of a concussion on all occasions will soon find himself as much perplexed as the tyro whose faith in the Hunterian definition of a venereal sore led him to reject by far the more usual forms of syphilitic ulcer, as not partaking of the essential character of the disease.

How many instances occur wherein it is not possible to know or determine, with any degree of accuracy, whether the primary condition is one of recoverable collapse or approaching death; whether the vomiting, the cold surface, the inactive pupil, the restlessness, increasing often to violent convulsion, speak only of temporarily arrested function, or denote a hopeless and helpless disorganization. Suppose, again, the first danger partially overcome; temperature restored; circulation tranquil; bowels and bladder acting healthily; still nothing rouses the patient to effectual consciousness; his best response is a groan or half-articulate sound, and he again lapses into a torpid slumber, without a sign of returning sense. Days—nay, weeks may elapse before the crisis of a protracted reaction arrives. Still it is possible that the lost balance may be restored, time alone being required, or in other words, continued rest. Slowly do the listless members resume their power, the eye its language, the mind its office, and the stomach its tone. Finally the patient may recover, waking as from deep sleep, but memory takes no heed of the past, and the progress of convalescence is nowhere better marked than in the slow revival of this faculty. Of all the accidents which occur to the brain, those followed by a slow reaction are the most interesting.

The state of torn brain is generally thought to be marked by convulsion, and I believe truly so, in fact it is an extreme instance of unsubsided irritation. Where

there is no external wound or artificial outlet, laceration, whether of surface or substance, the result of injury, is uniformly fatal. The brain never initiates an independent act of adhesion; and it does not reproduce itself. The local reaction, when death is not immediate, always induces a softened condition, and the semi-fluid debris are often smeared and infiltrated with a purulent secretion derived from the capillaries. Nature would appear altogether to decline the attempt at reconstruction, as being an effort to which she is wholly unequal. As to the instance of balls and substances which lodge, of which Hennen and others have given cases, or where portions of the brain have continued to escape for some time through an outer wound, these are not analogous examples, for there the spoiled material escapes at once, and absorption is not called for in anticipation of a process of contraction and cohesion, which has already commenced in the contiguous parts, and upon which permanent cicatrization depends.

Where there is an external wound giving a ready passage to spoiled and waste material, no appeal is needed to that roundabout process to which recourse must be had when such means of escape do not exist, and in the latter case the brain does not of itself exhibit any power to institute this essential preliminary of repair under such circumstances, viz., absorption.

Compression, whether by blood or bone, is well known to be fatal if unrelieved. Where the brain is compressed as well as torn, the characteristic marks of automatic-convulsive movements are often wanting; in other words, the organ being first completely paralysed by permanent compression, furnishes no evidence of any minor irritation. Laceration, which is one mode of irritation, is uniformly characterized by convulsion and unsustained efforts to promote and combine the manifestations of the will,—there is an imperfect volition; but when the paralysis is permanent, there is always pressure, and stertor is the sign of its direct and universal operation. In injured brain we observe two distinct effects of pressure, according to its site; it is either superficial or central. A deep-seated lesion, into which blood is poured on the instant, the result of recent injury, is directly fatal, and we may suppose that in such cases the heart's innervation is summarily subdued to extinction; but when a surface only is compressed, without breach of its tissue, the circulation becomes slow, laborious, and comparatively powerless, because the heart no longer receives or distributes its contents as heretofore. The blood moves more slowly, and there is a simultaneous deterioration of its quality. The capillary current presently finds itself impeded to down-right obstruction; the tissues are gorged or circulate black blood; the flagging heart, since it cannot impart energy, derives in its turn but slight assistance from the over-loaded lungs. Death, under such circumstances, is a process of slow suffocation. The happy reverse of this picture is every now and then presented to us by the wise and dexterous surgeon, and anybody who has once witnessed the effect of raising a depressed and compressing bone, or the giving exit to a mass of coagulum lying upon a surface of brain otherwise uninjured,

will not afterwards disclaim all faith in the practical resources of surgery.

It is important to bear in mind that there are many depressed fractures which exhibit no sign of compression. The symptoms of pressure amount, in fact, to an extreme degree of that mode of disturbance which, in a more mitigated form, we term an irritation. In another place I shall speak more fully of the signs of irritation; and I could quote many cases which prove the danger of omitting to remove all possible causes of offence to the brain and its membranes after injury, wherever it is possible to do so. It will be shown, that where a fracture is depressed, it is right to raise the displaced fragment, although the signs of compression be not present, for an unsubdued irritation so caused will sooner or later terminate in an act of inflammation of one or more of the membranes of the brain, accompanied by effusion into the cavities of that organ, and a permanent change in its consistence, the result of prolonged congestion in its capillary vessels.

On the whole, I would venture to suggest that the following arrangement of head injury is, perhaps, more simple and descriptive of its several forms than any hitherto propounded for general purposes of practice and observation. All these injuries may be regarded as belonging to one of two principal divisions, which may be termed—1. Commotion. 2. Compression. Irritation and inflammation of the organ can scarcely establish a claim to a separate divisional classification. These are rather remote consequences or incidents, and grow out of the peculiar circumstances of an individual case. As to their frequency, inflammation is more rare than convulsion, paralysis, or other purely neuralgic conditions, and especially so in recoverable instances.

Commotion is either fatal or transient, and remediable by art. It embraces all cases within the two extremes of shock or blow which kills immediately, leaving no visible disintegration or trace of its effect after death, and those examples of protracted reaction, the event of which is uncertain through a period of many days. To commotion I refer alike simple stunning to be followed by present recovery; also those mixed conditions of alternating stupor and excitement, which terminate fatally after an uncertain interval and depend upon lesion of the substance of the brain. The last are often characterised by so many signs of recoverable shock as to excite great doubts about their actual nature, until the patient begins to die. Torn substance and fractured basis, in all its forms, are of this class.

Compression, whether by blood or bone, is recognised as occurring in one of two forms:—

1. It is irremediable either from its extent or its intensity; or from the combined operation of these two causes.
2. It may be relieved by taking away the depressed and compressing body.

Compression remediable by art is of two kinds. It is either partial or complete.

When the effect is partial it is marked by signs of irritation; of this order are the spiculated growths,

angular projections, and some of the fractures of the internal table.

The other variety embraces all those cases of collapse, stertor, and insensibility, which mark the action as being at once persistent and complete.

If the whole be reduced to a tabular form, it may be displayed thus :—

Commotion.

1. Fatal, without lesion or reaction of any kind (rare.)
2. Simple, with a brief and healthy reaction (ordinary concussion.)
3. Obscure, with a slow reaction, and recovery more or less complete.
4. Lesion of the substance of the brain with or without fracture of the cranium, uniformly fatal in the latter, and ordinarily so in the former case.

Compression.

1. Directly fatal, whether from the nature or extent of the mischief.
2. Not directly fatal but remediable by art, and occurring in one of two forms.
 - a. Pure, by surfaces of blood or bone.
 - b. Partial, by depressed edges or spiculæ, the symptoms being incomplete and marked by signs of irritation.

(*To be continued.*)

ON CERTAIN PHYSIOLOGICAL AND OTHER FACTS

OBSERVED DURING THE

TREATMENT OF SPINAL DISEASE.

By SAMUEL HARE, Esq., M.R.C.S.

(Read before the Provincial Medical and Surgical Association, at the Annual Meeting, held at Worcester, August 2nd, 1849.)

It is not my intention on this occasion to enter into particulars as to the various forms and modifications of spinal disease, or the different plans of treatment they require; these I have had opportunities of referring to, when detailing the particulars of several cases, in papers which I have had, on former occasions, the honour of reading before the Association.

My object at present, is to lay before you certain facts, partly of a physiological character, but mainly relative to the improvement which takes place in the general health of patients during the progress of the cure of spinal deformities—facts which have repeatedly come under my notice during the many years I have specially directed my attention to the treatment of this class of diseases.

On the importance of physiological inquiries, I need scarcely insist, for assuredly physiology is one of the most interesting topics connected with our profession, being the basis on which we ought to rest, and the guide to the direction in which we should turn our attention, with a view to improve health, and, consequently, to prolong life, and by which we may introduce more of certainty into our practice.

In all cases of spinal deformity, even where the disease has attained only a *moderate* degree of severity, there is a certain amount of deformity of the chest consequent upon an alteration in the shape or direction, or both, of the ribs; each case may present some minor varieties, in the deformity of the ribs, just as the spine, in each case of lateral or other species of the disease, presents certain differences from other instances of the same class. But, speaking generally, the particular state of the ribs is determined by the kind of deformity with which the spine is affected; thus, in angular projection of the dorsal region, the ribs are compressed laterally, and the sternum projects forwards; in ordinary lateral curvature the ribs of the right side are rounded and projecting, while those of the left are compressed; in other cases the intercostal spaces are diminished, and the muscles very much wasted. All these changes, however, of the ribs from their natural position and direction are attended with certain effects in common,—their own motions are interfered with, they compress unnaturally, and often cause a displacement of, the thoracic viscera, so that, in some instances, the apex of the heart is found beating vertically below the middle of the left axilla; and in severe cases these deformities of the ribs have a similar effect, and to a very considerable extent, upon the viscera of the abdominal cavity, while the great vessels, situated upon the anterior aspect of the vertebræ, are twisted and bent in the same direction as the deformed spine.

As a consequence of these conditions, some of the most prominent symptoms, in advanced states of the cases under consideration, are—

1st. An impeded circulation of the blood through the lungs and other viscera.

2nd. Considerable difficulty in breathing, frequently attended with a cough.

3rd. An almost uniformly congested state of the digestive organs, producing want of appetite, indigestion, &c.

On the subject of the first effect, viz., the state of the circulation of the blood, it is obvious that as this fluid is necessary to nourish and sustain every part of the body, and as from it all the secretions are derived, anything which interferes with its due distribution must be very prejudicial to health. No better adaptation of means to an end can be conceived than that of the heart and arteries to the purpose for which they are intended; but if we take into consideration the curved state of many spines, and the similar state of the large vessels going to and from the heart—if we further consider the contracted state of the chest in such cases, with the necessarily impeded state of the circulation of the blood, we must at once see the injurious effects which pressure, either partial or general, upon the chest and abdomen, must have upon the general health. A due arterIALIZATION and a free circulation of the blood being necessary for the healthy performance of the functions of life, it is not surprising that, in patients affected in the manner I am describing,—lassitude, languor, and all their concomitants should be present, and all the functions be disturbed.