

CASE XVI. (A. T. Cabot, *Massachusetts General Hospital Records*, vol. cclvii. p. 214.)—Injury not known. Unconscious. Pupils equal, slightly contracted and reacting. Pulse full and slow. Respiration deep and regular. Bleeding from the right ear and left nostril. No paralysis. Edema of the right occipital and post-parietal region, and a depression felt the size of a twenty-five cent piece. Ten hours later partially conscious. The following two days remained stupid, with conjugate deviation of the eyes to the right.

Trephined at the seat of the injury—that is, the upper posterior parietal region on the right side. Depression found less than one-eighth of an inch. Blood-clot from surface of dura. Dura non-pulsating. Four days later convulsions of the left arm, leg, and face. Dura opened, and about one and a half ounces of blood-clot removed, coming from the region of the fissure of Rolando. Dura sutured and skin wound closed. Two days later restless. On the third day spasms of the left side and face. On the fourth day restless, ptosis of the right eyelid, and dilatation of the left pupil. Convulsions of the left arm, leg, and face. Partially conscious in the afternoon. On the fourth day suddenly became comatose and died.

CASE XVII. (C. B. Porter, *Massachusetts General Hospital Records*, vol. cclix. p. 136.)—A man, aged twenty-four years, was knocked down in the street. Conscious, but dull. Pupils equal and reacting. Twenty-four hours after the injury pulse slow. Swelling in the right lower occipital region. At the end of thirty-six hours increasing stupor. During the next two days improvement in the mental condition, and wanted to leave the hospital, and was discharged against advice. Four hours later brought back restless and delirious. Convulsions of the left arm; head thrown back; right arm rigid. Respiration shallow and stertorous, 30 to the minute. Right pupil dilated; left contracted and no reaction. Unconsciousness, coma; death four days after the injury.

Autopsy. Fissure in the right occipital fossa running into the foramen magnum. Small extra-dural clot in the right occipital fossa. Fissure running through the right occipital fossa across petrous portion of the temporal. Considerable sub-dural hemorrhage at the base of the left middle and anterior fossa. Laceration of brain.

CASE XVIII. (Wells, *N. Y. Medical Record*, May 14, 1892.)—Fell in the street. Unconsciousness was followed by frequent general convulsions. In three days convulsions became nearly constant. A small scar exposed on the left side of head above and in front of the ear.

Trephined under the scar and over the motor centres. Dura found adherent; no fracture, no depression. Dura dark, non-pulsating. On opening the dura a handful of clotted blood escaped, and the fissure of Rolando was exposed. Asked for a drink on coming out of ether. Recovery interrupted by occasional convulsions. Gave a history of a blow on the head three weeks before the present fall, followed only by severe headaches and weakness of the left arm and leg. Temperature 105° at the time of the operation. Blood-clot showed evidences of beginning breaking-down.

CASE XIX. (Bremer and Carson, *AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, Phila., 1892.)—A man, aged twenty-one years, fell one story, but walked home. Temporary unconsciousness and fall one week later, then aphasia. Right facial paresis and tongue protruded to the right. Loss of sensation over the whole of the left side. Agraphia. Paresis of the right hand in about two weeks; this increased, and the right leg began to be involved. Dulness of mind.

Trephined one and a quarter inches behind the external angular process of the parietal bone, and a quarter of an inch above the base-line. Dura dark and cloudy, non-pulsating. A large amount of fluid and clotted blood under the anterior branch of the middle meningeal artery between the dura and arachnoid, which was flat and empty. On the fourth day recovered from aphasia. On the sixth day recovered from agraphia. Complete recovery in nineteen days. Hemorrhage in this case from the anterior main branch of the middle meningeal.

CASE XX. (Mynter, *Annals of Surgery*, 1894, pp. 19, 539.)—A man, aged twenty-five years, received a blow on the head with fist. Face and eyes

swollen; severe pain in the back of head. On the twelfth day clonic spasms of right side of face and arm. Paresis of right side of face. Tongue drawn to the left. Left pupil contracted. Anæsthesia of face. Paresis of right arm and leg. Aphasia complete. Temperature normal. Pulse 96. On the thirteenth day could move right arm and leg, and seemed to understand questions, and to try to answer them. Restless. Pulse 120.

Trephined over speech and face centre. Dura bulging and bluish. On opening a stream of black blood spurted several feet into the air; three ounces evacuated. Clot three inches square and one-quarter inch thick. Brain then pulsated plainly, but appeared "compressed inward" and "excavated."

Sutured dura with catgut. Button replaced. No drainage. In two days said "yes" and "no," and in four days aphasia had disappeared. Paresis well in a week. Discharged well in four weeks, except for slight weakness of right hand.

CASE XXI. (Walker, *Cincinnati Lancet-Clinic*, June 17, 1893.)—A man, aged twenty-three years, received a blow on the left side of the head with a billiard cue. On the third day delirium. Right facial paralysis. Left pupil dilated and non-reacting. Involuntary micturition and defecation. Temperature normal. Scalp-wound two inches long on the left side of the head. Linear fracture of skull found under wound. Trephined under wound and dura found dark blue and bulging. A two-ounce blood-clot removed. Facial paralysis had disappeared on recovery from ether. On the eighth day hernia cerebri appeared and gradually increased to the size of a hen's egg. Hernia sloughed off in four weeks. Recovery in eight weeks.

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II.

MIDDLE MENINGEAL HEMORRHAGE.

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THE subject of middle meningeal hemorrhage has been exhaustively treated in the foregoing paper. There are, however, a few exceptional conditions, of importance from a diagnostic point of view, to which I would call attention.

In the first place, it should not be lost sight of that a sinus as well as an artery may be ruptured by wounds, as the following case (seen in consultation with Drs. Homan and Hildreth, fracture of the base with hemorrhage having been the probable diagnosis) illustrates:

Male, aged nineteen years, received a blow on the left jaw in a friendly sparring-bout; reeled; became unconscious in a few minutes. Within four hours tonic rigidity in all extremities had appeared, preceded by restlessness. Pupils first dilated, then contracted; the left slightly larger. Clonic spasm of right hand added to rigidity. Respiration terrorous. Ankle-clonus. No bleeding from the nose or ears, or under the conjunctiva. Eyes deviated to the right; head turned somewhat to the left. On the fourth day twitching of the right eyelid and angle of the mouth; extremities relaxed and paralyzed; slight twitching of right

hand and foot. Pulse at first 100, later 58 to 84. Temperature rose on sixth day to 106.4°, pulse to 130. Death on sixth day.

Autopsy by Dr. Swan. Surface of brain covered with extravasated blood under dura; most on left side and over occipital lobes. Middle fossa of skull contained several ounces of same, and base of brain covered with blood which extended into the vertebral canal. Small rent in left lateral sinus; no fracture.

To show that this is not a unique case, Dr. Pinkham, of Lynn, tells me that he found hemorrhage from the *longitudinal* sinus as cause of death following a blow received in a sparring contest in that city. He has not given me the details.

The next point to which I would allude is—

The hysteroid state. One factor in the diagnosis of hemorrhage, not mentioned in text-books, has impressed itself upon me, namely, the period of semi-consciousness which in certain subjects follows concussion and laceration, and gives rise to the suspicion of some more serious gross lesion, as hemorrhage. This condition is particularly likely to follow severe concussion in the case of young girls, though it also appears in adults, being by no means confined to patients previously disposed to hysteria. It seems rather the effect of profound shock and injury to brain-substance. It may, perhaps, be regarded as allied to the genuine traumatic neuro-psychoses. The patient, say a young girl, receives a severe blow on the head; a period of true unconsciousness follows. There is no bleeding from the nose or ears, no sub-conjunctival hemorrhage, no convulsive motion, no deviation of eyes or disturbance of pupils. The breathing is regular and of normal character. Notwithstanding the absence of other untoward symptoms, complete consciousness does not return for a number of days, or even weeks. There is not to be in these cases retention of urine. After a number of days the question naturally presents itself, Have we not to do with a hemorrhage, and should not trephining be considered? The absence of all symptoms, excepting the unconsciousness, should lead to the suspicion that we have to do with a mental state, rather than with a gross lesion.

In one such case, carefully watched for days by Dr. Richardson, Dr. Mumford, and myself, the first suspicion of the true condition was aroused by the struggles of the patient against the introduction of the catheter and the involuntary flow of urine accompanying these struggles. This patient, after lying for a number of days in a condition of apparent unconsciousness, finally answered a question in a perfectly natural and petulant tone of voice, as if angry at being disturbed. Gradual recovery without unfavorable symptom followed, but it was some months before the balance was perfectly restored. In a somewhat similar case, called to my attention by the attending physician, typical hysterical hemi-anæsthesia followed a protracted period of unconsciousness which had caused great uneasiness and uncertainty of diagnosis.

Various mental conditions may follow this condition, among which refusal to talk is perhaps most frequent. This was the case in a patient in Dr. Mixer's service, seen by me in consultation. This patient, an adult, after having been struck by an engine, remained apparently unconscious for a considerable time without sign of gross lesion, with eyes sometimes held open, sometimes shut. He refused to answer questions for a long time. Whether there may or may not have been method in the subsequent mental state of this patient there can be little doubt that the trance-like condition at first observed was to be attributed to the blow.

Without referring to the medico-legal complications, which may add to the difficulties of analysis in these cases, I would simply emphasize the fact that hysteroid sub-consciousness supervening upon a blow is not to be mistaken for the deepening unconsciousness which indicates hemorrhage.

In the consideration of the collected cases the following are some of the points which have struck me as worth bearing in mind apart from the classical symptoms: Paralysis may occur without preceding convulsions. The interval of consciousness may be wanting. Rigidity may appear without preceding clonic convulsions. Bilateral rigidity does not necessarily point to hemorrhage at the base, nor even to a bilateral hemorrhage at the cortex, but may result from extensive unilateral middle meningeal hemorrhage. In the latter case the onset will be, however, unilateral.

The prognosis of aphasia, as well as of hemiplegia, resulting from cortical hemorrhage, is generally good, if the effused blood be removed by operation, even though considerable laceration has taken place.

Three months is the longest interval on record between the time of receiving the injury alleged to be the cause of the hemorrhage and the onset of symptoms resulting from hemorrhage. (I have recently seen a case with Dr. Richardson, in which five weeks of apparent health intervened, followed by coma.)

Anæsthesia may result from cortical hemorrhage, but far less frequently and less marked than motor paralysis. Stertorous respiration, though a serious symptom, does not contra-indicate operation. Coma does not contra-indicate operation. The pupils may remain unaffected.

In the exceptional event that one arm be paralyzed and the other convulsed or rigid, other symptoms must be depended on for the location of the hemorrhage. In case the injury is on one side, and the symptoms on the same side, operate on the side indicated by the symptoms, rather than at the site of the blow.

Symptoms of fracture of the base added to those of middle meningeal hemorrhage render the prognosis unfavorable. Tonic rigidity may appear in parts previously paralyzed as regards voluntary motion.

If symptoms of hemorrhage are present and operation is undertaken at all, exploration should be thorough, certainly sufficient to expose the posterior branch of the middle meningeal artery. Diagnosis of the side of lesion may be made from paralysis of the third nerve alone, if general symptoms of hemorrhage are present. In case of bilateral convulsion a dilated and fixed pupil alone may indicate the side of hemorrhage. Deviation of the eyes and head, though important in corroboration, affords little help as a localizing symptom.

III.

LOCALIZED HEMORRHAGE BENEATH THE PIA MATER OVER THE UPPER THIRD OF THE ROLANDIC AREA, DUE TO A FALL ON THE HEAD:

LOCALIZED CONVULSIONS WITHOUT LOSS OF CONSCIOUSNESS; LATER,
SLIGHT MENTAL CONFUSION WITH PARALYSIS OF THE
AFFECTED LIMBS, FOLLOWED BY PROLONGED
COMA AND DEATH.¹

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The patient was a lady, seventy-two years old and of delicate health. The accident happened in the following manner: The house in which she lived was entered by a door at the top of four stone steps. Having walked up these steps she pulled the bell. The wire broke with her weight, and she fell backward onto the sidewalk. She was not fully stunned, however, and was able with some assistance to walk into the house and up a flight of stairs to her room. Dr. C. P. Putnam was called, but found her in good condition and discovered no signs of injury beyond a bruise and swelling of the scalp at the vertex. Later, I saw her a number of times in consultation. For twenty-four hours she seemed to be doing well. Then spasms began to occur in the left arm, and to a less degree in the left leg and the left side of the face. They were slight, of jerking character, not confined to any single segment, and not attended with loss of consciousness. These spasms recurred at short intervals during about two days. As they passed away the limbs became paretic and eventually paralyzed, and at the same time the patient's mental condition became disturbed. She grew somewhat talkative, but what she said was often irrelevant, the whole condition somewhat suggesting that of a person recovering from ether. Headache was scarcely complained of at all, and the pulse and temperature were unchanged or slightly increased. At the end of about two days more this state began to pass over into one of coma, which gradually

¹ Reported in connection with Dr. Scudder's paper.

deepened until her death, which occurred a few days later, or about ten days from the date of the accident. At no time did the pulse show the slowing usually supposed to attend compression. There was very little change in temperature at any period, hut toward the day of her death it gradually rose to a slight degree.

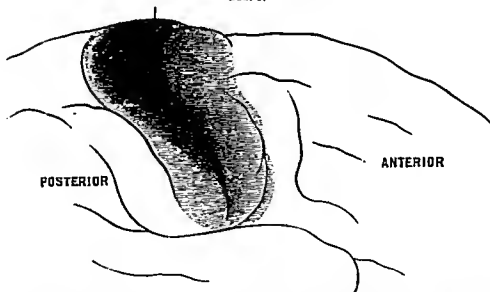
The post-mortem was made by Dr. W. F. Whitney, twenty-one hours after death, in the presence of Dr. C. P. Putnam and myself, and the following notes with the accompanying sketches were made by me on the spot.

FIG. 4.
Ant. central conv. Fissure Rolando.



Represents a cross-section at the thickest part of the clot, parallel to the median fissure and close beside it.

FIG. 5.



Shows the tapering of the clot toward its lower end, and indicates that the neighboring convolutions were covered with a thin layer of blood.

There was an extravasation of blood beneath the scalp covering the vertex and upper part of the occipital bone. The bone was not fractured. An extensive subdural hemorrhage covered the right hemisphere of the brain over its posterior half to near the point of the occipital portion. Besides this, a thick clot lay in the fissure of Rolando, at its upper portion, with the pia stretched smoothly over it. The central convolutions were forced apart by the clot at their upper end, and the