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ARTICLE III.—*Contributions to Forensic Medicine.* By JOHN REID, M.D. Edin., F.R.C.P.E., *Lecturer on Physiology, Superintendent of Pathology in the Edinburgh Royal Infirmary, &c.*

CASES WHERE A CONSIDERABLE QUANTITY OF BLOOD WAS FOUND EFFUSED INTO THE CELLULAR TISSUE WITHOUT EXTERNAL INJURY.

Circumstances might occur in which it would be of importance for a medical jurist to be aware, that considerable quantities of blood may be effused into the cellular tissue, and among the muscles, during certain diseases, and their becoming coagulated, present the appearances of an injury inflicted during life, or very shortly after death. We can easily conceive how cases analogous to those about to be related may lead the medical jurist to very erroneous conclusions, if called in to examine the body after death under suspicion of some foul play having been practised upon the deceased. We do not remember of having met with similar cases in the works on medical jurisprudence which we have had occasion to consult.

CASE I. A woman, aged twenty-six, died of pneumonia eleven days after her admission into the Infirmary, and the body was examined about forty-eight hours after death. As the weather was cold no signs of putrefaction had manifested themselves. The features were full, and there was much fat deposited below the integuments of the chest and abdomen. In cutting through the anterior wall of the abdomen, there was a considerable quantity of dark coloured and coagulated blood found effused into the sheath of the recti muscles, and extending from the pubis up to the umbilicus. A quantity of coagulated blood had also been effused along the lower margin of the right false ribs, and was situated in the cellular tissue below the external oblique muscle. The integuments covering those parts were of their natural colour. The appearances, in fact, resembled the effects of blows produced by a blunt instrument impinging upon a considerable extent of the surface of the body, but there was not the slightest reason to believe that any such injury had been inflicted.

CASE II. A man, aged thirty-nine, died of Bright's disease of the kidneys, four weeks after his admission to the hospital. It was not until four days after death that permission was procured to examine the body, and it was beginning to pass rapidly into decomposition. On cutting through the abdominal walls a considerable quantity of

dark-coloured coagulated blood was found effused into the sheath of the recti muscles around the umbilicus, without any external appearances indicating its presence.

CASE III. A man, aged forty, died of continued fever, three days after his admission. On inspecting the body twenty-four hours after death, a considerable quantity of dark-coloured coagulated blood was found in the sheath of the recti muscles around the umbilicus. The integuments covering this part presented their natural appearance.

CASE IV. A woman, aged twenty-nine, died of confluent small-pox on the eighth day after the appearance of the eruption, and the fifth after her admission into the hospital. On opening the body, the cellular tissue below one of the pectoralis major muscles was found extensively infiltrated with blood.

These four cases are the only ones of their kind which I have remarked in about 500 inspections which I have made in the Royal Infirmary; but as a limited part of the surface of the body is only cut into in making these inspections, it is quite possible that similar appearances might have been observed in other situations in these and in other cases, had other parts of the body been examined.

The following case is also worthy of notice :

CASE V. A male patient under the charge of Mr. Fergusson, now Professor of Surgery in King's College, London, died of erysipelas of the left leg, and of the perineum; and on uncovering the body, about twenty-four hours after death, for the purpose of making a *post mortem* examination, it was observed that the skin over the anterior and middle part of the leg affected with the erysipelas had assumed a dark purple colour, resembling so strongly the appearance of ecchymosed blood consequent upon injury, that all who were present confessed, that, if they had not been aware of the previous history of the case, they would have had little hesitation in attributing these appearances to some injury received during life. The anatomical examination of the limb, apart from all knowledge of the history, would, however, have disclosed to us, that this ecchymosed appearance had not been caused by external injury, for, on cutting into it, no blood had been effused into the cellular tissue, but the skin was increased in thickness, and its vessels loaded with dark blood.

The following case is interesting, as showing the dissimilar appearances presented by blood effused into different parts of the body, from injuries received thirty-one days before death.

CASE VI. An old woman, aged seventy, threw herself over a window during a fit of nervous excitement induced by smoking tobacco, and was placed under Dr. Robertson's charge. She had received a severe lacerated wound of the scalp, the skull was extensively denuded, and there was a simple fracture of the sternum and tibia. She died thirty-one days after the injury, gradually exhausted

by loss of blood, by the irritation and discharge from the wound of the scalp, and from sloughs forming over the sacrum.

Sectio cadaveris, twenty-six hours after death.—The denuded surface of the cranium was covered with granulations, except at two places near the vertex, where the bone was quite bare, and at one part rough. On removing the scull-cap, a fracture was found running obliquely upwards and backwards in the left parietal bone, beginning near the anterior and inferior angle. A layer of coagulated blood, about two lines in thickness, and about two inches in breadth, was found in the left temporal region, lying between the dura mater and the inner surface of the cranium. In one place it was of a brownish hue, but the greater part of it was still pretty dark-coloured. On the right side of the head, there was a similar effusion of coagulated blood, but it was situated inside the dura mater, and on the surface of the arachnoid covering of the brain—or, in other words, within the cavity of the arachnoid—and was placed more posteriorly than that on the left side. This last mass of coagulated blood was every where of a chocolate colour, showing that the process of absorption was much more advanced than on the left side.

A considerable quantity of coagulated blood was effused into the cellular tissue in the neighbourhood of the fractured portion of the tibia, which was still of a black colour, and presented all the appearances of a recent effusion. A small quantity of black blood was also found in the anterior mediastinum, around the part where the sternum had been fractured. The fractured ends of the sternum and tibia were firmly united. Circumstances might occur where the question may be raised, whether or not it is possible that different coagula of extravasated blood, varying so much in colour as in the case we have given above, could be the result of injuries inflicted at the same time. Though there could be no doubt that this patient received the different injuries we have mentioned, yet the blood which had been effused in consequence of these, had undergone very different degrees of absorption in different parts, as indicated by its appearance. The process of absorption had been most active from the inner surface of the serous membrane (arachnoid), and least active in the cellular tissue.

In a boy, aged eighteen, who received a severe injury from a railway waggon passing over the pelvis and lower part of the abdomen, and who died twenty-three days after the occurrence of the accident, from the sloughing of the integuments and subjacent parts, the blood effused into the cellular tissue presented the following appearance: On opening the abdomen the subserous cellular tissue over the bladder, the inner surface of the pelvis, and the lower part of the abdomen, was infiltrated with a dark-blue matter which appeared to be intimately incorporated with it, and was nowhere collected into separate masses.

Cases of Cerebral Disease.—The following case is a very important

one, for if the patient had received a blow during a scuffle, and not from an accidental cause, it might have led to most important consequences, if those who were employed to examine the body had failed to interpret aright the morbid appearances, and to discern their true character.

CASE VII. W. B. aged twenty-two, admitted 15th June, under the charge of Professor Syme. He was of somewhat dissipated habits, was muscular, and, as far as could be judged from external appearances, had enjoyed good health. About an hour and a half before his admission, he received a blow on the right side of the face, from the fall of a small bale of cotton. The blow was described to have been slight, and there were no signs of external injury. He was stunned by the blow, and fell down, but he immediately recovered, and remained sensible for a quarter of an hour, during which he walked about the distance of a gunshot to his own house. After this he again became insensible, and continued in that state up to the time of his admission. When admitted, his face was flushed. The pulse was ninety, and full; the respiration heaving; and the pupils dilated, and insensible to light; and he could not answer questions. A few minutes after admission, he was seized with a convulsive fit, which lasted four or five minutes. After recovering from this, he became exceedingly restless, remaining scarcely a moment in one position, and exhibiting a constant tendency to turn round and round on all fours. In general the attempt was a rotatory one, and was sometimes from right to left, at other times from left to right. This continued from eight o'clock in the evening till five o'clock next morning, and was followed by delirium. Next day the head was leeches, and he was bled from the arm. On the 17th the delirium greatly subsided, and he answered questions rationally. On the 18th the delirium again returned, and it was necessary to put him under restraint. The delirium continued, and his strength began to fail, and he died on the morning of the 22d.

Sectio Cadaveris, 23d.—No effusion of blood into any of the tissues of the scalp, and no fracture of skull. Some serous effusion under the arachnoid, and in the sulci between the convolutions, but not sufficient to elevate that membrane above the surface of the convolutions, except at the most depending part. No flattening of the convolutions, or pressing of the sulci together. On taking a slice from the upper part of the left hemisphere of the brain, though it did not extend to half an inch in depth, the lateral ventricle of that side was opened into, and a quantity of pure limpid fluid flowed out with a sudden gush. The lateral ventricle of the opposite side was equally distended; the septum lucidum was much stretched and reticulated at the posterior part. There was no softening of the inner surface of the ventricles, nor of any other part of the brain; and there were no appearances of inflammation to be observed on the inner surface of the ventricles. The substance of the brain was of its usual consistence,

and the only thing which appeared anormal when slicing the brain, was a greater quantity of blood in the vessels of some part of the brain, than in others. The quantity of fluid in the lateral ventricles might be between 3 and 4 ounces.

It would appear that this man received a severe injury on the head eighteen months before his death, and his wife has stated, that for sometime before he received his last injury, he was restless at night, and manifested this tendency to turn round.

We were fully convinced that the morbid appearances observed within the cranium, in this case, were not produced by the blow which the patient received shortly before his admission into the Infirmary, but had been going on slowly and gradually for a considerable time, probably commencing eighteen months before, when he received the severe injury. We arrived at this conclusion on the following grounds:—We are satisfied that, if an effusion of serum to the amount of between 3 and 4 oz. had taken place into the lateral ventricles in a young athletic person, in the short space of seven days,—the length of time which elapsed between the receipt of the last blow and his death,—the appearances observed would have been very different from those we have described. We believe from what we have observed, that it is impossible for so large a quantity of fluid to be effused in so short a time into the lateral ventricles, without producing that smoothness of the external surface of the brain, that flattening of the surface of the convolutions of the brain, and the pressing of these together, by which the sulci between them become indistinct or almost obliterated, so characteristic of rapid effusions into the lateral ventricles. In such cases we have conjoined, dryness of the surface of the brain, and a glistening appearance of the arachnoid membrane covering it; and also generally some softening of a greater or less portion of the substance of the brain, or some other signs of recent inflammation, either in the interior of the brain, or in its membranes. Here, however, there was some serous effusion under the arachnoid, and in the sulci between the convolutions—there was no flattening of the convolutions, nor pressing of them together, the serum in the lateral ventricles was quite limpid, and there were no traces of recent inflammation. The opinion that the anormal appearances observed in the brain were anterior to the last blow he received on the head, is further strengthened by the statement of his wife, that for sometime before this he was restless during the night, and manifested a tendency to turn round. The same or a similar set of symptoms would in all probability have subsequently manifested themselves in this patient without any injury of the head, but their occurrence was in all likelihood hastened by the effects of the blow. If this large quantity of fluid in the lateral ventricle, and the other appearances described, had been found in the brain of an aged and infirm person, or in an individual emaciated and debilitated by long-continued disease, we would feel considerable hesitation in attributing these to the

results of a morbid action, for it is not unusual, under the circumstances mentioned, to find considerable quantities of fluid both in the lateral ventricles and in the sub-arachnoidian cellular tissue, without being attended by any cerebral symptoms during life. We believe that the explanation of these appearances in such cases is, that the absorption of the cerebral substance proceeds more rapidly than these changes in the cranium, by which it accommodates itself to the size of the brain, and a quantity of serum escapes from the blood-vessels to occupy the space left by the removal of part of its solid contents. We do not, however, find this increased quantity of serum within the cranium in all aged and infirm individuals, nor in all those much emaciated by long-continued disease. We have collected, and are still collecting, a great number of facts upon this question, which will probably appear in some future numbers of this Journal.

This case is also interesting in a physiological point of view, as the patient manifested a tendency to perform the rotatory motions observed by Magendie after direct injury of one of the crura cerebelli, and also from vertical sections of the cerebellum, including one of its crura. This case, however, like others we could mention, afforded no evidence in favour of Magendie's views on this subject, for the crura cerebelli and cerebellum were very carefully examined, with a reference to this question, and no anormal appearances could be there detected. We shall close this communication with a case of sudden death from latent disease of the brain, under somewhat suspicious circumstances.

CASE VIII. A young woman, aged 19, who acted as a nursery-maid in the family of a gentleman, began to complain of slight dyspeptic symptoms, and her abdomen had increased in size. At the time of her death the menstrual discharge had not appeared for seven months, and the abdomen had acquired a considerable size, so that it was generally believed by her neighbours that she was considerably gone with child. She occasionally complained of slight pains in the abdomen, and of transient headaches, but they were never so severe as to attract much attention, nor prevent her from going about her usual duties. On the morning of her death she complained that she felt sick, and was advised to go to bed. She went to her room apparently for that purpose, but returned in a short time and stated that she again felt quite well. She then went out to walk with the child under her care, and shortly after returning she was suddenly seized with convulsions and insensibility, and was dead in a quarter of an hour. *Inspection 20 hours after death.*—On removing the skull-cap, the dura mater was found tensely stretched over the brain. The surface of the brain was smooth, the convolutions were pressed together so as nearly to obliterate the sulci, and the surface of the brain was dry and glistening. On removing a thin slice from the upper part of each hemisphere, the posterior part of the left was at least three quarters of an inch broader than the corresponding part of the

right hemisphere, and on touching it with the finger distinct fluctuation was felt. On making a deeper section, a quantity of bloody serum flowed out from the posterior part of the left hemisphere, and a large clot of dark-coloured coagulated blood came into view, mixed up with some broken-down pieces of brain. This clot would have nearly filled an ounce measure, and extended from near the posterior surface of the left hemisphere to the outer edge of the corpus striatum of the same side, and approached closely to the lateral ventricle, but had not opened into it. The substance of the brain in the immediate neighbourhood of the upper and outer surfaces of this clot was of a pale cream-yellow colour, and almost defluent (yellow inflammatory softening of the brain). The rest of the brain was of a pure white colour, but of normal consistence. The arteries of the brain were not diseased. The uterus was empty, but its outer surface, and that of all the other abdominal viscera, were covered with nodules of firm lymph, and several pounds of serum were contained in the cavity of the peritoneum.

I have inspected the bodies of two other females who died from apoplectic effusion of blood, consequent upon inflammatory softening of the brain. Both of them were seized with insensibility and convulsions, without any premonitory symptoms, except that one of them had complained of a slight headache a very few hours before the commencement of the attack. One of these was $13\frac{1}{2}$ years of age, and died three hours after the commencement of the attack. The other was 33 years of age, unmarried, and was nearly seven months gone with child, and died nine hours after the commencement of the attack. In another case the softening of the brain proved fatal, without any effusion of blood. This woman was about 30 years of age, and presented herself in the waiting-room of the Royal Infirmary about 11 o'clock A.M., and stated that she had suffered from headache for about a fortnight or three weeks. About an hour after this she was found in a state of insensibility, and in a few minutes all signs of life had disappeared. A considerable portion of the left hemisphere was softened, was of a light yellow or cream colour, without any surrounding redness, or any other change. These patients must have been going about with a latent disease of the brain, which in three of them was not indicated by any symptoms, and were liable each moment to the occurrence of the most alarming and dangerous attacks on exposure to any cause of excitement.

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 neighbourhood of the upper and outer surface of this clot was of
 a pale cream-yellow colour, and slightly yellowish translucent
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 colour, but of unusual consistency. The surface of the brain was not
 smooth. The surface was empty, but in some places, and that
 of all the other abdominal viscera, were covered with nodules of firm
 lymph, and several pounds of serum were contained in the cavity of
 the peritoneum.

I have inspected the bodies of two other females who died from apo-
 plectic effusion of blood, a complaint more frequently occurring in
 the brain. Both of them were small and slender, and in the
 first without any previous symptoms except that one of them
 had complained of a slight headache a very few hours before she died.
 One of them was 154 years of age, and the other was
 33 years of age, unmarried, and was nearly seven months pregnant
 when she died. Both were found dead in a room in the house of the
 mother, and the mother of the first was found dead, without any
 extension of blood. This woman was about 50 years of age, and
 presented herself in the winter of 1841 at the Hospital Lying-in, about
 11 o'clock a.m., and stated that she had suffered from headache for
 about a fortnight in those words. About an hour after this she was
 found in a state of insensibility, and in a few minutes all motion of the
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