TRAUMATIC RUPTURE OF INTESTINE: ACUTE PERITONITIS: DEATH.

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THE sequence of events leading up to death in the case here related is the usual one in cases of acute peritonitis following rupture of the intestine, but there are one or two points of special interest in this case.

About 11 P.M., on July 30th, 1892, J. G., a labourer, aged 46, was kicked in the lower part of the abdomen. He was for the moment somewhat stunned, but almost immediately was able to get into grips with his assailant, throwing him down and falling above him. He made little complaint for about twenty minutes, when he began to feel pain in the abdomen. He sat down, bending forwards with his hands pressed on the injured part, and said to his wife that he was "done for." About an hour afterwards he became sick and vomited, while the pain became intense, and spread over the whole abdomen. His wife poulticed him during the night, and next day called in Dr. C. S. Young, who saw him sixteen hours after he had been assaulted. He found him lying in bed, with his shoulders raised and his knees drawn up. He had a pinched and anxious look; his pulse was rapid but not thready; the whole of the abdominal cavity was greatly distended and tympanitic, and very tender on palpation; there was no swelling or bruising of the penis or scrotum. About midnight, however, twenty-four hours after the assault, his wife noticed some swelling of his genitals. At 9.30 A.M. next day he insisted on getting out of bed to make water, and, with the assistance of his wife, he managed to walk to the kitchen sink for that purpose. He did not pass any water, but his wife noticed that the swelling of the scrotum and penis had increased enormously. While being assisted back to bed he fell down on the floor and died, thirty-five hours after the injury.

I was asked by the Procurator Fiscal to make a *post-mortem* examination of the body, and did so along with Dr. Young, thirty-four hours after death. We found no marks of bruising on the abdomen or any other part of the body. There were several large bullæ filled with bloody serum on both sides of the abdomen, probably the result of the poulticing, but the abdominal wall showed no discoloration from putrefactive changes. The scrotum and penis were enormously enlarged, being three or four times their normal size, from emphysema of the cellular tissue. The same condition was also present over the upper part of both thighs, the front of the abdomen and chest, the neck and face, the shoulders, and upper part of both arms. There was no bruising of the muscles of the abdominal wall or rupture of the parietal peritoneum. The whole of the peritoneum covering the intestines was much injected, and covered with flakes of soft recent lymph. The edges of the convolutions of the intestine were glued together. The abdominal cavity contained about 12 ounces of a thick grumous fluid, with a slightly fecal odour. Three inches from the ileo-caecal valve on the free border of the ileum was a rupture, half an inch in length, horizontal in direction, with its edges everted and the mucous coat protruding. There was some ecchymosis of the serous coat for about an inch on either side of this. The stomach, duodenum, jejunum, and part of the ileum were distended, and the rest of the intestine was collapsed. There were some solid faeces in the descending colon and rectum; the bowel was otherwise quite normal. The bladder contained 2 or 3 ounces of urine. The left internal abdominal ring was patent; the opening leading into the sac of an inguinal hernia, which admitted the whole of the index finger; the sac was, however, empty. The rest of the body was normal.

The immediate effect of the kick was a slight degree of shock of a very transitory character, no symptoms having appeared for twenty minutes. The extensive subcutaneous emphysema observed at the *post-mortem* examination is a feature of great interest. It was evident that its presence could not be accounted for by putrefactive changes, as the body was quite fresh, and there was no discoloration of the thoracic and abdominal walls such as always precedes the development of gas in the cellular tissue. The emphysema of the scrotum and penis was observed for the first time about midnight of July 31st, and increased enormously between that time and the time of his death (10 A.M., August 1st). It was not present when Dr. Young examined the deceased in the afternoon. Its occurrence in this region is somewhat difficult to explain, seeing that the parietal peritoneum was quite uninjured. The only probable explanation which suggests itself is that when the pressure in the abdominal cavity had reached a certain height the gas had forced its way in the direction of least resistance through the old hernial sac into the cellular tissue of the scrotum and penis, but had been prevented from passing higher by the great tension of the abdominal walls. After death, however, this state of matters would be altered, and on the occurrence of rigor mortis, owing to the relaxed condition of the superficial parts of the abdominal wall, the contraction of the muscles would still further force the gas out of the abdomen through the cellular tissue of the scrotum and penis into that of the

abdominal walls and the other regions in which it was observed.

The assailant in this case was afterwards tried on a charge of culpable homicide, but although the evidence of the assault was unequivocal, the jury were apparently unable to believe in the possibility of a fatal or even serious internal injury being inflicted without some visible external marks of bruising. They consequently returned a verdict of "guilty of a simple assault," and the accused was liberated on paying a fine of 20 shillings.

ON THE ELIMINATION OF LEAD IN CHRONIC LEAD POISONING.

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THEORIES AS TO THE CHANNELS OF ELIMINATION OF LEAD.

THE mode in which lead is eliminated from the human organism in cases of chronic lead poisoning, and the influence of drugs in producing its elimination, are still disputed points. Some state that the kidneys are the chief eliminators, others the bowels. A great deal of confusion has arisen from the fact that many of the chemical researches on this subject have been made on the lower animals and their excretions. In experiments on animals, although the amount of lead introduced into the organism is actually small, it is relatively large when compared with the minute daily doses received by human beings in drinking water, which may not contain more than one milligramme of lead per litre. In man the inception of the poisoning is usually extremely gradual, each dose being infinitely small; it is only by the prolonged and continuous action of the poison that its toxic effects are produced. A further objection to comparative experiments exists in the difference in susceptibility and in the eliminative channels in animals as compared with man. Ellenberger and Hofmeister¹ found that in sheep the elimination of lead mostly takes place by the kidneys. As will be presently shown, this is not the case in man.

Many of the statements as to the action of drugs in promoting elimination are founded on isolated chemical observations, or on observations which, from the manner in which they were conducted, render them valueless. The subject appeared worthy of investigation, and, having two cases of chronic lead poisoning in the Salford Royal Hospital, I determined to make a series of analyses of the excretions, in order to ascertain the conditions under which the metal is eliminated.

OBJECTS AND RESULTS OF THE AUTHOR'S INQUIRY.

The questions sought to be answered are: (1) What is the relative importance of the channels by which lead is eliminated in chronic lead poisoning? (2) What influence have the drugs usually prescribed in such cases on the rate of elimination?

The first case was that of a young woman aged 21, who had been a general servant in a publichouse for about one year. In October, 1890, she felt a soreness and general aching in the arms with progressive loss of power. She had never had colic. She was admitted into hospital, December 8th, 1890. She presented the two prominent symptoms of chronic plumbism—wrist drop with marked atrophy of the extensors of the forearm, and the blue line along the margins of the gums. Any further clinical description would be foreign to the subject under discussion. The lead had been taken in drinking water, which was found to contain 2.4 milligrammes per litre. The other residents in the house were not affected. This, however, is not very unusual. It is well known that some persons are much more susceptible to the influence of small amounts of lead than others. The patient showed no gouty diathesis, but it was ascertained that she had taken alcohol freely. Whether her exceptional condition, as com-

¹ *Centralb. f. Vet.-Wissensch.*, 1885.