posterior columns of the cord. As much of the mass as possible was removed.

Postoperative History.—The patient did not improve after this operation, but grew steadily worse, and within a few weeks was completely paraplegic. She finally was taken to a home where she died.

CASE 7.—Tumor of cauda equina. Laminectomy; partial removal of tumor. Improvement.

Patient.—Case No. 1401, Surgical No. 268. R. E., a man aged 41, insurance broker, U. S. Chr., was admitted to the hospital service of Dr. Bailey, May 25, 1911. Past and family history negative. For one year he had been troubled with frequent desire to micturate, and three months before admission he became entirely incontinent. For three months he had been gradually losing power to stand alone or to walk. The bowels would not move without an enema, and the rectum was incontinent if he took a cathartic.

Examination.—Head, upper extremities, chest and abdominal viscera were normal. There was flaccid paralysis of both lower limbs, the right greater than left, and marked wasting of limbs, right greater than left. There was a double foot-drop; the patient could not move the toes or ankles; could draw the legs up slightly in bed. The anus was markedly relaxed. The abdominal and epigastric reflexes were active and equal; patellar, absent on both sides; cremasteric absent; Achilles, absent on both sides. There was no Babinski; no clonus. Sensation: There was slight hypesthesia in distribution of first, second, third, fourth and fifth sacral over the posterior surface of the limbs, also in the distribution of the fifth lumbar in the right leg only; marked hypesthesia in the left leg, and marked hypalgesia in the distribution of the fourth and fifth lumbar and all of the sacral posterior roots on the right and slight hypalgesia over the same areas on the left side. The temperature sense was impaired in the same localities as the pain sense.

Operation.—Laminectomy by Dr. Elsberg. The twelfth dorsal, first, second, third and fourth lumbar. When dura was incised a large reddish-brown, gelatinous-looking tumor was found filling up the entire spinal canal in this region. It extended above and below beyond the limits of the opening made into the canal. The wound was closed in such a manner as to permit of the extrusion of the tumor. The patient was in a very weakened state when taken to the operating-room, and stood the operation very poorly. Owing to his general asthenic condition, it was impossible to perform the secondary operation until more than a month after the primary. The second operation was performed by Dr. Beer. At this time the tumor was found fairly well protruded from the canal, but still extending above and below the limits of the former incisions. With a curet, and by sponging, as much of the soft tumor mass was removed as was possible. Patient stood the operation fairly well.

Postoperative History.—Three weeks later he could move his legs somewhat better than before the operation. He could draw the leg upward decidedly better and could move the toes of both feet and flex and extend the ankle, which could not be done before the operation. There was no change in his bladder condition. No appreciable change in sensory disturbance.

One month later he was removed to the City Hospital, his condition being as above stated. Reports from there up to date do not show any improvement in his condition.

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Disease and Heredity.—In the case of disease, what we do inherit is not any particular disease, but a predisposition, and the inheritance exists in the germ-plasm. As every disease requires its appropriate stimulus, the germ-plasm may be represented as a gun, and the stimulus the finger pulling the trigger. Should the gun be loaded, as soon as the trigger is pulled there is an explosion, and the disease manifests itself. Should the gun not be loaded, the trigger can be pulled repeatedly, but no explosion results.—C. T. Ewart in *Proc. Roy. Soc. of London*.

POSITION AS A FACTOR IN DRAINAGE OF THE PERITONEAL CAVITY *

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For a long time surgeons have held that abscesses should be drained at their most dependent portion. The principle is so firmly established—in fact, so self-evident—that one wonders that it should ever be necessary to enunciate it. But it is, as anyone who teaches clinical surgery will vouch. When, however, one suggests that this principle should be applied in attempted drainage of the abdomen a storm of protest arises, the chief objection with which I have had to contend being that the abdominal cavity cannot be compared with abscess cavities, for here we have “the intra-abdominal pressure” favoring our attempts to drain; just as if the walls of any ordinary abscess exerted no pressure whatever!

It is granted that intra-abdominal pressure favors drainage of the abdomen, let the opening be where it will, but surely that pressure can work to better advantage if it does not have to overcome the influences of gravity.

Another objection, more recently offered, is that one cannot drain the peritoneal cavity at all, since it has been proved experimentally that drainage thereof is impossible. It is true that Yates,¹ in a series of experiments on dogs, found that his drain was completely shut off from the general peritoneal cavity in less than ten hours, and about the same time F. T. Murphy,² working with cats, found that rubber tissue wicks drained up to fifty-two hours. It will be seen that the results of these investigators do not quite agree, but even though both had found the cavity entirely shut off in ten hours or less, it must be remembered that they were dealing with normal peritoneal cavities and it seems reasonable to suppose that adhesions will be more quickly formed in such than in those in which fluid is present.

It is quite likely that surgeons will for some time yet continue to *try* to drain the peritoneal cavity (or intra-peritoneal abscess if you will) in certain conditions, and it is even possible that a day may come when drainage will no longer be even thought of.

For many years no attention whatever was given to the position of the patient's body in draining the abdomen and no special attention perhaps to that of the incision. Reference is made to the position of the latter by Peaslee,³ who credits Keith (about 1855) with incision of the vagina and the use of drainage tubes. Since then drainage through the rectum⁴ even has been advocated as being always available and reaching a lower point in the peritoneal cavity. It was Clark,⁵ who (in 1897) was the first American surgeon to make us think of position as a factor in abdominal drainage. It was at that time the custom to drain after almost all clean abdominal operations to prevent postoperative peritonitis. Muscatello⁶ had a short time previously shown that the diaphragmatic peritoneum alone absorbed lymph

* These experiments were performed in the anatomic laboratory of the Washington University Medical School and that of the St. Louis University Medical School in St. Louis, and a preliminary report of the work was made before the St. Louis Surgical Club in May, 1911.

1. Yates: *Surg., Gyn. and Obst.*, 1905, 1, 473.

2. Murphy, F. T.: *Boston Med. and Surg. Jour.*, 1905, ciii, 34.

3. Peaslee: *Ovarian Tumors*, Appleton, New York, 1872, p. 509.

4. MacLaren: *THE JOURNAL A. M. A.*, 1910, lvi, p. 2105; *Pol-lard: Brit. Med. Jour.*, July 25, 1908, p. 196.

5. Clark: *Johns Hopkins Hosp. Bull.*, April, 1897.

6. Muscatello: *Virchows Arch. f. path. Anat.*, 1895, cxlii, 327.

from the peritoneal cavity, and Wegner⁷ had proved that the peritoneum could dispose of great quantities of infectious material, and Clark, to hasten the absorption of postoperative exudate and so avoid the necessity for drainage, advocated raising the pelvis and lowering the head. The position never became popular, quite likely because Clark himself soon after showed the disadvantage of drainage in clean cases.⁸

Bode,⁹ in 1900, reported from the city hospital of Frankfort-on-the-Main successes in treating suppurative diffuse peritonitis by multiple drains with flushing and raising the head of the bed; about the same time Fowler¹⁰ published his results with the method and advocated raising the head of the bed from 12 to 15 inches. Other surgeons, finding their results so much better by use of this method, have gone on raising the patient, till now one sees and hears a great deal about the advantages of "the half-sitting posture" as a routine matter after placing drains. This half-sitting posture or even the sitting posture soon becomes an uncomfortable one to a sick patient and is not without its disadvantages in weak heart and low pressure and even when it is used and drains placed in the pelvis in the usual way the lowest point of the cavity is not drained.

Harbin,¹¹ in 1905, recommended the ventral decubitus, but its use has not become general; possibly because of the discomfort to the patient.

Since 1900 I have frequently demonstrated to students in anatomy the fact that with the body supine the lowest point in the pelvic cavity is from 4 to 6 inches lower than the upper margin of the symphysis pubis, while with the body vertical (standing or sitting) the lowest point in the pelvic cavity (peritoneal) is from 1½ to 2½ inches below the upper margin of the symphysis pubis; that the lowest points in the abdominal cavity with the body supine and horizontal are in the neighborhood of the mid-points of the external arcuate ligaments and that with the body supine on the table a greater thickness of wall separates the pelvic cavity from the table than separates the abdominal cavity from the table in the neighborhood of the ligamenta arcuata externa.

Coffey¹² showed that, in order to have fluid flow into the pelvis from the hollow on either side of the spine without turning the body on the side, it was necessary to raise the thorax and upper abdomen so that the long axis of the abdominal cavity was at an angle of 60 to 70 degrees with the horizon.

For the past three years I have used the lateral position with the upper part of the body raised to about 30 degrees with a pillow under the body above the iliac crest and drained below and internal to the anterior superior iliac spine in all suppurative conditions in the lower abdomen in which I thought drainage indicated, always turning the patient on the side most involved. I find it more satisfactory.

G. R. Fowler¹³ states that Dawbarn poured milk into the peritoneal cavity of a cadaver and was unable even to wash it all out, though he repeatedly flushed the cavity with water. It has been stated¹ that Helvetius, Mikulicz and Delbet poured water into the cavity and never could get it all back. Sanger¹⁴ does say that "Helvetius allowed 500 gm. to flow in, then tubes were inserted and some knocks were given with the hand, on

which Helvetius was surprised that no fluid came out." Mikulicz and Delbet are also said¹ to have performed the experiment with similar results, but I have been unable to find their original papers.

EXPERIMENTS

Experiment 1.—As the body lay supine and horizontal 1,000 c.c. of water were poured into each loin of a cadaver from which the viscera had been removed. The fluid was deepest in the region of the eleventh and twelfth ribs. The body was now gradually raised toward the sitting posture. By the time the body was raised to an angle of 40 degrees the pelvic cavity was full and there was still fluid in both loins. The water now began to escape from the pelvis over the symphysis. The body was slowly raised to within 10 to 15 degrees from the vertical—or practically bolt upright. When the water ceased flowing over the symphysis it was found that the pelvic cavity still contained over 500 c.c. of fluid.

Experiment 2.—With the body supine 1,000 c.c. of water were poured into the pelvic cavity. The body was now turned toward the right side. The water flowed from the pelvis over the psoas into the iliac fossa and upward into the flank. If the body were turned just more than half way between pronation and supination all of the water escaped from the pelvis.

Experiment 3.—Experiment 2 was repeated, turning the body toward the left side with similar results.

Experiment 4.—With the body in the right lateral position and the water in the flank as in the last two preceding experiments, the thorax and upper part of abdomen were gradually raised till the long axis of the abdominal cavity was at an angle of 40 to 45 degrees with the horizon. The water gravitated, first filling the space between the right iliacus muscle and the anterior abdominal wall and then flowing over the right psoas into the pelvic cavity.

Experiment 5.—Experiment 4 was repeated with the body in the left lateral position with similar results.

Experiment 6.—Half-inch non-collapsible split rubber tubes were inserted into the cavity at points just below and internal to the anterior superior spines of the ilia, and Experiments 4 and 5 were repeated. All of the water escaped before the body was raised beyond 40 or 45 degrees, the results on the two sides being similar.

Experiment 7.—A male body in which the viscera were still *in situ* was now selected and a small incision made in the median line about 2 inches above the umbilicus, another incision about 2 inches in length was made in the median line just above the symphysis. With the body supine 500 c.c. of water were introduced (by catheter and syringe) into each loin. Some of the water found its way to the pelvic cavity in the undisturbed condition of the body. The thorax and upper abdomen were now elevated and the water soon began to escape through the lower incision. It continued to do so until the body had been raised to within 15 to 20 degrees of the vertical and then none flowed, though the body was raised bolt upright. The collected water did not quite total 500 c.c. and the waste was slight. The pelvic cavity still contained fluid and 34 c.c. were recovered from it by syringe.

Experiment 8.—Water (1,000 c.c.) was introduced as before and half-inch non-collapsible split rubber drainage tubes inserted just below and internal to the anterior superior iliac spines. The body was turned on its right side. While it was being turned some of the water escaped from the lower median incision, and almost as soon as the movement was completed water ran from the tube in the right side. The thorax and upper abdomen were slowly elevated. The water continued to run until the long axis of the abdominal cavity formed an angle of 40 to 45 degrees. About 750 c.c. were collected, probable waste 100 c.c. Not more than 10 or 15 c.c. were collected with syringe and catheter on suction in loins and in pelvis.

Experiment 9.—Experiment 8 was repeated, turning the body on the left side. None was lost through the median incision this time. As before water began to flow from the

7. Wegner: Quoted by Clark: See Note 5.

8. Clark: Am. Jour. Obst., May, 1897, xxxv, 481.

9. Bode: Centralbl. f. Chir., 1900, xxvii, p. 33.

10. Fowler, G. R.: Med. Rec., 1900, lvii, 617.

11. Harbin: Med. Rec., 1905, lxxii, 776.

12. Coffey: THE JOURNAL A. M. A., March 10, 1907, p. 937.

13. Fowler, G. R.: Pract. Therap., Hare, 1897, p. 599.

14. Sanger: Am. Jour. Obst., 1890, xxiii, 1009.

tube before the body was raised and it continued to do so as the body was raised as before, ceasing by the time the body was raised to 45 degrees. About 600 c.c. were collected, probable waste 40 c.c. With syringe and catheter nearly 250 c.c. were recovered from the right loin ten minutes after the body had been replaced in its original position.

Experiment 10.—In the abdomen of a male body a small incision was made in the median line just above the umbilicus and with syringe and catheter 500 c.c. of water were introduced into each loin. A loop of small bowel was withdrawn and a catheter fastened into its wall. Air was now pumped into the intestine till the abdomen was moderately distended. An incision 1 inch long was made in the median line above the symphysis and the body slowly raised. Water began to escape from the lower incision before the body had been raised more than 20 degrees and continued to do so till from 60 to 70 degrees was reached. About 500 c.c. were recovered, waste 30 or 40 c.c. About 150 c.c. were recovered from the pelvic cavity with syringe and catheter and less than 10 c.c. recovered from the right loin, none from left.

Experiment 11.—500 c.c. of water were introduced as before and the body turned on its right side, just more than midway between pronation and supination. An incision 1 inch long was made just below and internal to the right anterior superior iliac spine. Some water escaped at once. The usual tube was inserted. More water flowed. The body was now slowly raised as before, water continued to flow from the tube until the body was elevated to from 40 to 45 degrees. Barely 735 c.c. were recovered, waste 30 or 40 c.c., and it was impossible to recover any with the syringe.

Experiment 12.—Experiment 11 was repeated, turning the body on the left side. The amount of water recovered from the tube inserted just below and internal to the left anterior superior iliac spine was only slightly more than 500 c.c. and more could not be made to flow out, no matter how high the body was raised. On lessening the distention, about 120 c.c. were recovered from the right loin.

CONCLUSIONS

The experiments showed:

1. The pelvic cavity could not be completely drained of water by raising the supine body even to 90 degrees "bolt upright."
2. The pelvic cavity could be completely emptied of water by turning the horizontally placed body just more than mid-way between pronation and supination.
3. Water found its way from the left loin to exit just below and internal to the right anterior superior iliac spine with body raised to 45 degrees in the right lateral position.
4. With a distended condition of the intestines, although water gravitated less readily, practically the same results were obtained.
5. Although water found its way from the left loin, as above stated, it did not so easily find its way from the right loin to exit just below and internal to the left anterior superior iliac spine; no matter how high the left laterally lying body was raised a quantity remained in the right loin.

I wish to express my thanks to Professor Terry in the Washington University Medical School and to Professors Eycleshymer and Shoemaker in the St. Louis University Medical School for their great kindness and courtesy, and to Dr. H. McClure Young for valuable assistance.

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Health Insurance.—I am in favor of compulsory low-wage insurance, and believe that it will come sooner or later in some form and that it is our duty to keep awake that we be not the loser but be benefited by the arrangement. All of which means complete organization.—J. N. Davis in *Journal of Kansas Medical Society*.

CLINICAL ASPECTS OF SYPHILIS OF THE LIVER *

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An error in diagnosis gave me the incentive for reviewing this subject. I had occasion to observe a patient for a period of one and a half years. He had what I considered to be fairly typical symptoms of gall-stones, whereas the operation showed that the clinical picture was due to multiple gummata of the liver. The general literature of this topic gave me the impression that the keenest clinicians frequently failed to suspect the syphilitic process in the liver since it mimics, as Arthur R. Edwards¹ puts it, a great many diseases of the liver and gall-bladder.

HISTORY

Syphilitic jaundice was known as far back as Paracelsus, Matthiolus and Francois de la Boë Sylvius. French writers, among them Lancereaux,² Cornil and Mauriac, have emphasized the relationship between icterus and syphilis. Werlhof (1732), J. Frank (1821), and Yvarres (1854) had a knowledge of fever in lues. Guntz first recorded syphilitic fever by a thermometer. Frerich³ in 1861, Bäumler⁴ in 1872, and Hirschberg and Raichline⁵ in 1894 called attention to the fever accompanying syphilis. Bäumler⁴ reported seven cases of syphilis, mostly joint cases, all having a hectic type of fever. The names of Lancereaux in France and Virchow in Germany are closely connected with the study of syphilis of the liver, both as an anatomic and as a clinical entity.

During a period of eighteen years thirty cases were diagnosed during the patients' lives at the Johns Hopkins Hospital.⁶ Among 2,500 necropsies in the same period there were forty cases of gummata or scars and fifteen syphilitic eirrhoses. An analysis of 5,088 post-mortems by Flexner at the Philadelphia Hospital showed forty-two cases with interstitial changes, twenty-two gummata, sixteen cases of perihepatitis, seventy of amyloid degeneration, and thirty-eight of specific scars. The post-mortem records of St. George's Hospital, London, for a period of forty-two years, showed that among 11,629 post-mortems, there were thirty-seven cases of gummata and twenty-seven of syphilitic scars.

PATHOLOGY

The *Spirochæta pallida* is, of course, the primary etiologic factor of the disease. Additional factors put the liver in a state of *locus minoris resistentiæ*, thus favoring a pathologic process in that organ. Gastro-intestinal disorders, especially those in which ptomaines are in excess in the intestinal tract, throw more work on the liver, which, as we know, has among other functions, that of destroying ptomaines. This is the view entertained by Hirschberg and Raichline. Alcoholism, trauma, malaria, preexisting jaundice, which lessen the resistance of the liver, are predisposing factors. In a case of Pitt, the syphilitic process developed on the site of an old hydatid cyst.

* Read before the Chicago Medical Society, Oct. 28, 1911.

1. Edwards, A. R.: *Ann. Jour. Med. Sc.*, 1910, cxi, 527.

2. Lancereaux: *Syphilis hépatique*, *Union Méd.*, 1889, No. 40.

3. Frerich, Th.: *Klinik der Leberkrankheiten*, 1861.

4. Bäumler: *Deutsch. Arch. f. klin. Med.*, 1872, ix, 397.

5. Hirschberg and Raichline: *Bull. gén. de thérap.*, June 30, 1895.

6. Quoted from "A System of Syphilis," D'Arcy Power and J. Keough Murphy, III.