VIII.—Similar to VII, except that the Preponderance of Antitoxin was greater, namely, 0.000075 g. of Venom and 1 c.cm. of Serum per kilo. of Body Weight in each Case.

Animal.	Weight in Grammes.	Time during which Venom and Serum were left in contact before heating.	Results.
i. Rabbit	1,025	Venom only (control)	Died in 12 hours.
ii. "	1,190	2 minutes	" 20 "
iii. "	1,130	5 "	" 23 "
iv. "	1,060	10 "	Lived. Very ill 2 days.
v. "	1,250	15 "	" Ill 1 day.
vi. "	1,210	30 "	" No symptoms.
vii. "	1,070	Not heated at all	" "

IX.—Similar to VII and VIII, but the Preponderance of Serum is still greater, namely, 0.00005 g. of Venom and 1 c.cm. of Serum per kilo. of Body Weight in each Case.

Animal.	Weight in Grammes.	Time during which Venom and Serum were in contact before heating.	Result.
i. Rabbit...	1,070	Venom only (control)	Died in 15 hours
ii. " ...	1,200	2 minutes	Lived. Very ill 2 days
iii. " ...	1,170	5 "	" Off feed 1 day
iv. " ...	1,130	10 "	" No symptoms
v. " ...	1,030	15 "	" "
vi. " ...	1,450	30 "	" "
vii. " ...	1,050	Not heated at all	" "

NOTES AND REFERENCES.

- ¹ Ann. de l'Inst. Pasteur, 1895, p. 250. ² Zeit. f. Hyg., 1896, B. xxii, p. 521. ³ Vratel, 1896, vol. xxxi, abstracted, Jour. Phys. Chem., 1896, p. 983. ⁴ Cent. f. Bakt., 1897, vol. xxii, p. 521. ⁵ Demonstrated at the meeting of the Physiological Society, October, 1896, not published in Proceedings. ⁶ Fortschritte der Med., 1897, No. 2. ⁷ Report of Proceedings of Pathological Society of London, Lancet, March 5th, 1898, p. 644. ⁸ Ann. de l'Inst. Pasteur, 1895. ⁹ C. J. M., Intercolonial Medical Journal of Australasia, August, 1897. ¹⁰ C. J. M., Journal of Physiology, vol. xx, 1896. ¹¹ Journal of Pathology, 1897, p. 460. ¹² Loc. cit. ¹³ Brodie, loc. cit. ¹⁴ This small diminution in toxic power by filtration may possibly be due to the action of oxygen at high tension (50 atmospheres of compressed air) or to the size of the toxin molecule being of the order of the molecular size of albumoses. Albumoses as shown by one of us (Journal of Physiology, 1896) passed through gelatine, but less readily than water, and the filtrate is consequently less concentrated than the original solution. ¹⁵ Loc. cit. ¹⁶ C. J. M., Proc. Roy. Soc. N.S.W., 1896. ¹⁷ C. J. M., Intercol. Med. Jour., August, 1897.

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CASE OF EXCISION OF A MASS OF ENLARGED CERVICAL GLANDS (TUBERCULOUS) WITH A PORTION OF THE INTERNAL JUGULAR VEIN.*

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OWING to the frequency with which tubercle primarily manifests itself in the lymphatic glands there is no subject more important to the surgeon and the general practitioner than its treatment. Upon this point a good deal of controversy has taken place, especially (and this for æsthetic reasons) in relation to cervical tuberculous lymphadenitis, but I think most surgeons have now come to recognise the fact that, as tuberculous glandular disease manifests itself clinically in many ways, so the line of treatment must vary to meet these different morbid conditions. Broadly speaking, the main groups under which cervical tuberculous lymphadenitis presents itself are three in number.

1. A single movable gland.

* Patient was shown on April 1st, four weeks after operation, at the meeting of the Glasgow Medico-Chirurgical Society.

2. A bunch of movable glands, all of which remain separate and distinct from one another.

3. A large mass of glands matted together and embedded in dense, fibrous tissue. When grasped it is felt that the mass, though movable as a whole, has firm and deep attachments, and that the individual glands composing it are blended one with another.

My own line of practice as regards the first two groups is rather to rely on constitutional treatment, but if resolution does not take place, and caseation and softening are imminent, to proceed to incision with complete evacuation of the tuberculous contents by the sharp spoon, followed by stuffing with Berlin wool (Stiles) impregnated with iodoform. Very careful subsequent dressing gives excellent results, and the small incisions made become in time very slightly noticeable.

It is a different matter when one has a case that belongs to the third group, where the anterior and also the posterior triangle of the neck is occupied by a large and fixed tumour of considerable size, which is not yielding to the constitutional measures of treatment that have very properly been advocated in the earlier stages of the disease. The first thing to be done in such a case, of course, is to be sure that what we are dealing with is a local tuberculosis of the lymphatic glands; a condition unquestionably of an infective nature, as shown by its passing from gland to gland, and yet not necessarily part of a general tuberculosis. We must also be satisfied that the swelling is not of the nature of a lymphadenoma, that is, a special affection of the lymphoid tissue throughout the body, nor either of those forms of sarcoma known as lymphosarcoma and lymphatic gland sarcoma. This point having been cleared up (if necessary, by a preliminary incision to remove a small gland or a portion of a larger one) we have then to decide what should be the treatment of so extensive a local tuberculous lymphadenitis.

One point that must always weigh with us is the age of the patient. In young children excision is not to be recommended. Reliance must be placed on caseation and softening of the glands with subsequent incision and scraping. No doubt some risk of general tuberculosis is run, but very young children do not bear well the lengthy and severe operative measures that such cases undoubtedly entail. It is different, however, with young adults. If they are otherwise in good health excision is, I consider, the best treatment for any big mass of enlarged cervical glands that, notwithstanding constitutional treatment, is rather increasing in size and extent. It was on these grounds that I decided to operate on a case that was sent to me by Dr. Moorhouse of Stirling.

She was a young girl of 17 years of age, of slight build and rather delicate appearance. She stated that for some time, even as far back as March, 1897, she had had pain in the left side of her neck, but it was not until last November that she noticed any swelling. Since then there has been a great increase in its size and also in the local uneasiness. When I first saw her at the end of January, the enlarged glands not only occupied part of the anterior triangle of the neck on the left side, but also extended under the sterno-mastoid muscle into the posterior triangle, forming a continuous mass along the posterior border of that muscle and the anterior border of the trapezius as far down as the clavicle. When grasped they felt firmly anchored down to the deeper structures, and I had no doubt they were adherent to the carotid vessels and the internal jugular vein. I advised a further trial of constitutional measures, but towards the end of February it was clear no improvement was taking place and that the case could only be met by operative measures. The operation that seemed to me called for was the removal of the glandular mass on the lines recommended by Mr. Watson Cheyne in Vol. i of *King's College Hospital Reports*, one of the distinctive features of which is the excision of any portion of the internal jugular vein involved in the swelling. This was accordingly done on March 2nd. The incision chosen was the S-shaped one that has been recommended by Senn. (See Fig. 1). The first part of it runs parallel to the body of the lower jaw, and it then passes backwards towards the occiput. After describing a good curve it is carried forwards again towards the clavicle, to be continued backwards in a second curve, if necessary, and then end at the acromion.

When this flap was reflected forwards, I found that the sterno-mastoid muscle was adherent in its full extent to

the glandular tumour. It was freed from its origin to its insertion and held aside, and I found it unnecessary to divide it, as is sometimes recommended. The glandular mass was now fairly exposed, and at its lower part I was able to define the internal jugular vein. It was secured between two ligatures and divided, and I then proceeded to strip it up, along with the enlarged glands, from the carotid vessel and the vagus nerve. This was not so difficult a procedure as I expected. While working upwards every tributary vein was carefully tied with a double ligature before being divided, and all small arterial vessels were similarly secured, so that very little hæmorrhage occurred. When I had got well above the tumour, I secured the internal jugular vein with a double ligature close to its exit from the skull, and then divided it across. This done, the mass of glands was separated from the parotid gland, to which it was adherent, and eventually completely removed by freeing its posterior portion in a downward direction towards the clavicle, care being taken to dissect it carefully off the branches of the cervical plexus.

Fig. 1.

When this was accomplished, the edges of the incision were brought together by a number of horsehair stitches of coaptation, a few relaxation ones of silk worm gut being also employed. No drainage tubes were used.

The glands excised (see Fig. 2) formed a mass measuring $5\frac{1}{4}$ inches vertically and $2\frac{1}{4}$ inches transversely at the widest part, the upper portion being made up of a number of large glands (some softened) firmly matted together. Passing downwards the glands were smaller in size, forming a narrow neck where they passed beneath the sterno-mastoid muscle and ended in a small mass consisting of fat and a number of small glands. It was this portion that lay in the lower part of the posterior triangle. On the inner aspect of the mass (see Fig. 2 A) may be seen a portion of the internal jugular vein measuring $2\frac{1}{2}$ inches in length, and forming, along with a portion of the common facial vein, the letter Y. It is embedded in the enlarged glands, and it is evident that any attempt to dissect it off them might easily have led to its being wounded.

One of the glands, the size of a bean, was examined microscopically. The greater part of the gland proper had caseated

and did not take on the stain. Towards the periphery some gland structure remained, and scattered through it were numerous giant cells, with the nuclei arranged in a peripheral manner. The gland capsule was found to be thickened, and showed considerable proliferation of connective tissue cells (endothelial cells), and there were present here and there giant cells similar to those already described. Stained for tubercle bacilli, one or two were found.

The after-progress of the case was very satisfactory, and the wound healed without suppuration. The only observations I would make in reference to this case are that, where such an extensive operation has to be done, I think the S-shaped incision is the best for giving that free access to the part that is so necessary, being preferable to the one along the anterior border of the sterno-mastoid muscle. I believe, too, it will eventually leave the least deformity. Fig. 1 bears this out, although the incision was purposely darkened with a blue pencil so as to make it distinct in the photograph. The experience of this case also satisfies me that for thoroughness of removal

Fig. 2.

the ligature of the internal jugular vein is necessary, while it undoubtedly simplifies the removal of the glands, prevents venous hæmorrhage, and does away with the risk of entrance of air into the veins. I think, too, that it shortens the length of the operation. I was fortunate in this case that none of the glands were advanced in caseation, the result being that in the unavoidable manipulations none of them gave way and infected the wound with their contents. In those cases where isolated glands have softened it would be better to open these glands first, scrape them, and, having stuffed them with iodoform gauze, go on with the operation. Formidable as this operation is, I believe that for cases of an advanced type, such as the present one, it is our only hope of satisfactorily removing a tuberculosis which is very apt to become general. A recent letter from Dr. Moorhouse tells me that the patient has already improved in health.