A CLINICAL LECTURE ON SOME UNUSUAL TUMOURS.

Delivered at Middlesex Hospital,

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GENTLEMEN,—During the past few months several unusual cases of tumours have come under our observation; some of them are worth your careful notice as they illustrate points of interest in diagnosis, in pathology, and in treatment.

I.—PREGNANCY COMPLICATED BY A DERMOID INCARCERATED IN THE PELVIS: OVIOTOMY AT EIGHT AND A-HALF MONTHS: ANURIA FOR FIFTY HOURS: RECOVERY.

In July, 1894, Dr. Leonard Hine placed under my care Mrs. H., aged 31, at the same time furnishing the following facts: A year previously she was confined with her first baby and had a very tedious labour terminated by "turning." The child was stillborn. The difficulty in delivery was caused by a pelvic tumour, which Dr. Hine believed to be a dermoid. Twelve months later the patient again came under observation, nearly seven months pregnant. An examination proved that the tumour was wedged in the pelvis in a very dangerous position.

When the woman came under my care she was, according to her "reckoning," seven months and one week advanced in pregnancy. The movements of the fœtus were obvious enough. The upper half of the patient's face was pigmented, the colour being yellow and identical with that characteristic of xanthelasma. This "mask" deepened as the pregnancy advanced and formed a striking contrast with the fresh pink colour of her cheeks.

The hollow of the sacrum was occupied by a tumour of the dimensions and shape of a large turkey's egg; the big end was lying well behind the left broad ligament (mesometrium), but the pointed end projected obliquely downward towards the vagina. The cervix was drawn up and pushed towards the symphysis pubis. The tumour was very hard, and even slight pressure upon it produced pain. I was able to satisfy myself that the tumour was incarcerated by the uterus, for I could distinctly move the big outer end, but the history of the case deterred me from attempting to push it out of the pelvis, for the squeezing to which it had been subjected in the previous labour had in all probability led to the formation of adhesions. The tenderness and hardness of the tumour, as well as the resistance it offered to the passage of the child without bursting, served to convince me that it was in all probability an ovarian dermoid. Two other possibilities were entertained, (1) a tumour of the sacrum, (2) a sequestered extrauterine fœtus. Of these, the first was disproved by the mobility of the outer pole of the tumour, and the second was put out of court by the history of the case, for the woman was intelligent and furnished a very clear and definite account of her illness.

Although the condition of affairs was quite plain and serious enough, and admitted of one interpretation—interference of some kind—it was not quite so simple to determine the treatment, as several plans were suggested. After careful deliberation I decided to keep the patient under observation in the hospital until she was within two weeks of the date at which the pregnancy was estimated to terminate, then open the abdomen and endeavour to remove the tumour; failing this, save mother and child by Cæsarean section. It was July 24th when this course was determined. I did not re-examine the patient until August 15th; in the interval the uterus had settled into the pelvis and depressed the tumour so much that its lower end could be felt as soon as the finger cleared the vulvar orifice. She had been complaining of occasional pains in the belly, and as I was anxious that she should not come prematurely into labour, I decided to operate on August 21st, when she was within half a month of the calculated date of labour.

Mr. Burns, with his usual care and judgment, rendered the patient unconscious with A.C.E. mixture, and I opened the

abdomen as for ovariectomy. On introducing my left hand, I detected the right ovary far above the level of the navel; the hand was then very gently carried over the face of the uterus, and passed behind the left mesometrium, and at once encountered the tumour. I circumscribed its circumference with my forefinger, gently and slowly detaching slender adhesions. On attempting to extract the tumour there was difficulty, for it was so incarcerated by the uterus, aided by atmospheric pressure, as to demand the expenditure of some force to raise it; then by tilting the tumour so as to destroy the vacuum, it suddenly popped out. The pedicle, very long and slender, vascular and soft, was transfixed and tied with thin plaited silk, and the incision closed with waxed silk sutures, 1 cm. apart. The wound was dressed, and the patient put to bed. Half a grain of morphine was given in a suppository to still the uterus.

At the end of twenty-four hours the patient had passed no urine; in other respects her condition was reassuring. Forty-eight hours later there was still anuria, pulse 140, temperature 102°, slight vomiting and restlessness. To account for the anuria, I concluded that the impaction of the dermoid had in all probability compressed the left ureter, and abolished the function of the left kidney, hence by keeping the patient on her back the weight of the uterus had obstructed the flow of urine down the right ureter. Dr. W. Duncan saw the case with me, and agreed that labour should be induced to relieve pressure. I had the patient turned upon her left side, with the hope of temporarily relieving pressure, and shortly afterwards Dr. Berkeley introduced a bougie into the uterus under Dr. Duncan's supervision.

The effects of the change of position were simply magical; two hours later the woman voided half a pint of urine without effort. When I saw her six hours later the temperature had fallen to 100°; pulse steady at 120; no pain, and freedom from any kind of discomfort, and she had passed an additional pint of urine—altogether 1½ pint in six hours after the change of position.

On the fifth day after the operation and fifty-four hours after the introduction of the bougie she was delivered (by forceps) of a living, vigorous, male babe. Coincident with delivery the yellow mask on her face began to fade, and in three days disappeared completely. Convalescence was rapid.

The tumour was a dermoid, consisting of one loculus and several diverticula, filled with epithelial and fatty debris of the consistence of fresh putty, the whole forming an ovoid inelastic mass.

Whilst the mother was in labour it occurred to me that the amniotic fluid might, in consequence of the fifty hours' anuria, contain an abnormal proportion of urea, especially as it is probable that in the late stages of pregnancy the fœtus defiles this fluid with urine. Mr. Mackenzie Edwards, house-surgeon in charge of the case, undertook the investigation. The mother, previous to the operation, had been passing urine very freely (70 ounces daily), and, after the period of anuria, the output of urine rose to 60 ounces daily, with an average of 1.5 per cent. of urea. The amount of liquor amnii collected measured 1 pint and contained .5 per cent. of urea. I believe the average proportion of urea in amniotic fluid is 2.6 per 1,000 parts, but it has been observed to contain 5.0 per 1,000 in uncomplicated cases, and as the proportion in my case only equals this it fails to throw any additional light on the question.

I have ventured to bring this case under notice, because it contained many points of interest. It is an easy matter to collect a hundred or more successful cases of ovariectomy during pregnancy, but if anyone will take the trouble to study the cases collected from the most varied sources by Dairne, he will find that the great majority were performed before the fourth month. A fair number belong to the seventh, and a few to the eighth, month. Pippingsköld was successful at the ninth month. In all the records I have been able to consult of ovariectomy performed in the late stages of pregnancy, the tumour was situated above the uterus. I have failed to find records of an ovariectomy performed late in pregnancy with the tumour incarcerated in the pelvis as in the present case. It is an instructive fact that an ovarian tumour can be removed from such a difficult position, at a very late stage of pregnancy, without initiating

labour. It is a fact which I shall not hesitate to make use of in the future.

It is not difficult to estimate the danger the mother would have incurred by retaining the tumour. The early volumes of the *Transactions of the Obstetrical Society*, contain illustrative cases recorded by Berry, Playfair, Warn, Brewer, and others. Briefly summarised, the risks are these: (1) Rupture of the uterus; (2) rupture of the vagina; (3) rupture of the cyst, or subsequent suppuration, with the risk of fatal peritonitis; (4) certain death of the child from unavailing attempts of Nature, or mutilation at the hands of the accoucheur; and (5) death of the mother save in such extraordinary circumstances as the expulsion of the tumour or its contents through the vagina (natural ovariectomy). Even in these exceptional instances life was spared at the cost of awful suffering.

The successful issue of the operation in the present case is a threefold source of gratification. The mother's life is spared as well as that of the child, and the mother has been rendered capable of making useful additions to the population of Great Britain.

II.—A CERVICAL DERMOID.

A man, 23 years of age, was admitted under my care with a tumour of the size and shape of a Tangerine orange, situated in the neck immediately above the sternum. A small knot had been noticed in this situation many years, but latterly it had grown very quickly, and as the man was an indoor servant, and the "lump" in the neck was far from ornamental, he decided to be quit of it. (Fig. 1.) There was much speculation in regard to the character of this tumour, but on

Fig. 1.—Dermoid of the neck.

closely examining I found that it could be moulded with the fingers and made to assume any shape, like so much plastic clay. This circumstance, in connection with its long history and the position of the tumour exactly in a "line of coalescence," led me to regard it as a dermoid filled with putty-like material. Its removal was a simple matter, as it lay between the skin and the deep fascia, embraced by the sternal origins of the sterno-mastoid muscles. The walls of the dermoid were very thin, and the cavity contained putty-like material and a few light-coloured hairs.

Dermoids in this situation are very unusual, and this is the only example which has come under my observation. A not uncommon position for dermoids is the middle line of the anterior wall of the thorax, at the level of the mesosternal joint.

III.—CHONDROMA OF A LUMBAR VERTEBRA.

Dr. Lawrence, of Chepstow, placed under my care a man, aged 40, with a tumour in the loin. The patient had noticed

a swelling in his back for two years, but it caused him no inconvenience until three months before he consulted Dr. Lawrence, when he began to suffer pain in the front of the thigh; this led him to seek advice.

I found a tumour as big as a turkey's egg projecting from the right side of the lumbar spine into the ilio-costal space; this tumour, embedded in the erector spinæ muscle, was very hard, fixed, and painless; it could not be detected by manipulation through the abdominal wall. The patient complained of pain in the thigh corresponding to the distribution of the external cutaneous and anterior crural nerves. I came to the opinion that it was in all probability a chondrifying sarcoma springing from, or involving the arches of, the upper lumbar vertebrae, and implicating the anterior divisions of the upper two or three lumbar nerves. The man was in vigorous health, the tumour of slow growth, and favourably situated for removal. I exposed the tumour by a longitudinal incision parallel with and 4 cm. from the spines of the lumbar vertebrae. The cut involved skin, lumbar fascia, and erector spinæ muscle. The tumour had a strange corymbose appearance. In the process of removal rounded, grape-like pieces became detached, several containing a central cavity filled with mucoid fluid. The base of the tumour was seated on the expanded transverse process of the second lumbar vertebra; a prominence of the tumour projected forwards through the space between the second and third lumbar vertebrae, and invaded the quadratus lumborum muscle. During the whole of this deep operation no vessel required either forceps or ligature. The incision in the muscle was united by catgut sutures, and the skin wound sutured with waxed silk, and dressed with iodoform gauze and cotton

Fig. 2.—Chondroma of the lower thoracic vertebrae. An outrunner of the tumour has crept into the neural canal and compressed the cord, producing fatal paraplegia (Museum, St. Bartholomew's Hospital).

wool. In twenty-one days the patient left the hospital free from pain, and the wound soundly healed. The tumour is composed of pure and well-formed hyaline cartilage; near its base it has undergone calcification.

I have spent a large amount of time in studying oncological literature as well as tumours preserved in museums, but I can only refer you to one example which in any way resembles this. It is a remarkable specimen preserved in the Museum of St. Bartholomew's Hospital. I have had it engraved because my acquaintance with this specimen helped me very materially in deciding the probable nature of the swelling in Dr. Lawrence's patient. In the drawing (Fig. 2) you see four vertebrae in sagittal section. A chondroma occupies the outer surface of the vertebrae and a rib, whilst an outrunner from the tumour has crept through an intervertebral foramen,

spread upwards and downwards in the neural canal, compressed the cord, and produced fatal paraplegia.

IV.—ENLARGED ACCESSORY THYROID GLAND: FATAL DYSPNOEA.

This case illustrates the baleful character which environment sometimes imposes on even simple tumours. A man, aged 36, was found lying upon his back in a street adjoining the hospital, apparently in a fit. When brought into the casualty room by the police he was dead. Mr. E. A. Fardon, the resident medical officer, detected in the course of the *post-mortem* examination a tumour connected with the cervical section of the windpipe, and drew my attention to it. I had no difficulty in deciding that this tumour was an enlarged accessory thyroid gland; it was embedded in a thick fibrous capsule, its inner segment being firmly fixed to the trachea in the neighbourhood of the fourth to ninth semi-rings. The tumour, including its capsule, was somewhat larger than a dove's egg (Fig. 3), but it had severely compressed the trachea, so that on section it presented at the seat of compression the form shown in Fig. 4.

The central part of the tumour exhibited under the microscope the characteristic structure of thyroid gland. The capsule consisted of dense laminæ of fibrous tissue. Had this tumour been recognised during life it could have been easily enucleated from its capsule.

Fig. 3.—An enlarged and encapsulated accessory thyroid gland. It compressed the trachea and produced fatal dyspnoea.

A curious feature of this case is the thick capsule by which this accessory gland is invested. Such capsules are not uncommon around foreign bodies—for example, fragments of glass, metal, and the like—also around parasites, such as *echinococcus* (hydatid) cysts, and present the peculiar lami-

Fig. 4.—Section of the enlarged accessory thyroid gland and trachea, showing the amount of stenosis (natural size).

nated arrangement so markedly exhibited in the present specimen. I am at a loss to explain it. In this instance the fatal result seems to be due to this thick sheath binding the gland firmly to the trachea. The cyst on the thyrohyoid membrane (Fig. 3) is an enlarged bursa, which usually exists between the body of the hyoid bone and the thyrohyoid membrane.

The following case is useful as illustrating the way in which pathological knowledge intensifies diagnostic power.

V.—IMPLANTATION CYST OF THE THUMB.

This case concerns a housemaid aged 18, who sought relief on account of a hard ovoid tumour growing on the thumb in the position shown in Fig. 5. The tumour was distinctly circumscribed, firmly connected with the skin, and could be moved from side to side over the sheath of the flexor tendon.

Fig. 5.—Implantation cyst of the pulp of the thumb.

It had been slowly growing during three years, and had reached a size which caused inconvenience in using the thumb, but it had never been a source of pain. There was no difficulty in recognising it as an "implantation cyst," that is, by some accidental puncture a piece of skin had been engrafted in the subcutaneous tissue, and had grown into a tumour. After Mr. Carwardine made a sketch of the thumb, I cut the tumour away with a scalpel, and drew the cut edges of the skin together with two stitches; it was hardened, and in due course sectioned for the microscope; and, as you see for yourselves, there is a central cavity containing fluid and epithelial scales surrounded by thick walls containing all the tissues of the skin in an inverted order.

This kind of tumour was formerly described as sebaceous cyst of the finger, but a careful study of the structure and history shows conclusively that it has nothing in common with sebaceous cyst, and the mode of origin excludes it from the genus dermoid. The term "implantation cyst" is a useful one, as it enables the student without effort to remember the peculiar mode of origin of such tumours.

Implantation cysts are produced in a variety of ways: for example, punctures by awls, forks, needles, thorns, glass, etc.; wounds made by knives, teeth, or falls. Lücke, in his

article on Tumours, in Pitha and Billroth's well-known *Chirurgie*, mentions that dermoids sometimes follow injury (trauma) in early life, and as an illustration writes:

"A child, 6 years old, was seized in the right orbital region by a dog, but without actual wound of the skin; some weeks later a tumour appeared in this region, its presence had never been noticed before. It gave the characters of a dermoid."

Among my own cases I have an example of an implantation cyst in the forehead of a pretty girl, which formed in the scar of a wound, due to a blow from an angular stone, three years previously.

TETANUS ANTITOXIN; ITS PREPARATION AND PROPERTIES.

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A SHORT description of the mode of preparation of tetanus antitoxin may be of interest at the present time when antitoxins and the antitoxin treatment are occupying so much attention. The work, on which the following account is based, was carried out mainly on the lines followed by Roux and Vaillard,¹ and may be divided into the following stages:

PREPARATION OF THE TOXIN.

A simple method was adopted for the cultivation of the tetanus bacillus, and gave excellent results.² Glass flasks of a capacity of about 120 c.cm., and of the form known as "yeast flasks" were used; these have a narrow glass tube attached to the neck, for the first inch or so passing horizontally outwards and then bent downwards at right angles.

The neck of the flask is corked with a perforated rubber cork, through which a narrow glass tube passes to the bottom of the flask, projecting 2 inches above the cork. This projecting portion of the tube and also the end of the lateral tube are plugged with cotton wool, care being taken that the plugs are loose enough to allow gas to pass freely through them. The flasks are filled with a grape sugar bouillon, sterilised, and inoculated after momentarily withdrawing the rubber cork and tube. The air is expelled from the flask and replaced by hydrogen by connecting the projecting glass tube with a Kipp's hydrogen apparatus, the gas bubbles through the bouillon and escapes by the lateral tube.

After the hydrogen has been passing for half an hour, a small capsule containing mercury is applied to the free end of the lateral tube, so that its open extremity just dips beneath the surface of the mercury. The projecting end of the tube, which passes through the rubber cork, is then sealed off in the blowpipe flame. The flask is thus filled with hydrogen which cannot escape, nor can air enter on account of the mercurial valve, though if any gas be formed during the growth of the organism it can escape, while the glass flask can be used again and again. The flask, with the mercurial valve *in situ*, is placed in an incubator at 37° C. After a lapse of two days the bouillon becomes turbid, and gradually a small precipitate, consisting chiefly of bacilli and spores, falls to the bottom; a surface film never forms. The culture can be used after it has been growing for three weeks, but preferably for a month; after five weeks' growth the virulence seems to diminish. Such a culture is so toxic that after filtration $\frac{1}{100}$ c.cm. of the filtrate is sufficient to kill a guinea-pig weighing 300 to 400 g. The cultures are filtered before using, and an antiseptic is added to the filtrate to prevent subsequent putrefactive changes. At first thymol was used, but this was found to produce a slight precipitate after a time.

As I have elsewhere pointed out,³ thymol, though an efficient antiseptic for such a purpose, is a precipitant of proteid substances, and must be used with caution when these are present. Carbolic acid was afterwards employed, one part of a 5 per cent. aqueous solution of carbolic acid being added to every nine or ten parts of the fluid culture, corresponding to an addition of about .5 per cent. of carbolic acid.

This addition does not in any way modify the virulence of the filtered culture, which seems to keep indefinitely in a dark cool place; at any rate, there is no loss of activity after a lapse of four months. The mixture of carbolic acid and culture is then filtered through porous porcelain, preferably after previous filtration through paper, to remove the organisms. This can be conveniently carried out by means of a Chamberland filter, which is connected with an exhaust pump by a rubber tube, the filter "candle" being immersed in the fluid contained in a glass cylinder of suitable size. On exhausting, the fluid passes into the interior of the Chamberland filter, which, when full, is disconnected from the pump, and the clear filtrate shaken out into a stoppered bottle. The process is repeated as many times as necessary, and the fluid obtained forms the toxin which is used in the next stage—that of immunisation.

IMMUNISATION.

In order to obtain a quantity of antitoxin the animal chosen was a horse, which was injected with the prepared toxin after the method employed by Roux and Vaillard, except that it was found necessary to proceed more cautiously. To commence with: the toxin is weakened by the addition of an equal volume of Gram's iodine solution,⁴ of this mixture gradually-increasing doses are injected subcutaneously in the neck or shoulder, starting with .5 c.cm. and going up to 8 c.cm. or 10 c.cm. This took from May 2nd to June 22nd, three injections being given weekly. The next two doses were 4 c.cm. and 8 c.cm. of a mixture of 2 parts of toxin and 1 part of Gram's iodine solution. After this, commencing July 2nd, the pure toxin was injected, the dose being 1 c.cm., which was increased by degrees until 22 c.cm. were injected on July 23rd. On July 25th 4 c.cm. were injected into the jugular vein, followed by rather alarming symptoms half an hour after, the animal falling prostrate, with legs extended, laboured respiration, and rapid small pulse. These symptoms, however, lasted only about ten minutes, after which the animal seemed to recover completely. On three other occasions somewhat similar attacks occurred after intravascular injections.

In spite of the apparent risk, the injections into the jugular vein were continued in gradually increasing amounts, and on August 30th the animal received a dose of 70 c.cm. without ill-effect. There was then an interval of a month without injection, and blood drawn on September 29th was found to have an antitoxic power of about 50,000.⁵ This of course was not nearly sufficient, so the treatment was resumed on October 8th, when 6 c.cm. were injected into the jugular vein. The doses were rapidly pushed until November 19th, when 90 c.cm. were administered. At the beginning of December the antitoxic power of the blood serum tested on guinea-pigs was found to be about 1,000,000. The total number of injections, subcutaneous and intravascular, was 57, spread over a period of five months. It will thus be seen that the treatment was very tedious, and doubtless it might have been carried out more rapidly, but I desired to be on the safe side, as I had had the misfortune to lose my first horse. Roux and Vaillard obtained an immunity of 1,000,000 after a course of treatment lasting three months, and following their programme exactly my first horse developed tetanic symptoms after the fifth dose. I was also unable to increase the dose of toxin as rapidly as these authors seem to have done. The intravascular injection must be a risky procedure, and I question whether it is at all necessary, there being no need for it, for example, in the preparation of diphtheria antitoxin, and in another case I should certainly try to do without it. The smaller doses, up to 15 c.cm., were injected by means of a Loeffler syringe, the larger ones by an ordinary glass syringe attached to a large hypodermic needle by a short length of india-rubber tubing. The needles and syringes were disinfected with 1 in 20 carbolic solution before use, and in no instance did any trouble ensue from the puncture.

PREPARATION OF THE ANTITOXIN.

Allowing three or four days to elapse since the last injection

⁴ Iodine 1 part, potassium iodide 2 parts, water 300 parts.

⁵ By this is meant that 1 c.cm. of the serum will protect or immunise 50,000 grammes of guinea-pig against the minimum fatal dose of tetanus toxin. An immunising power of 1,000,000 means that 1 c.cm. of the antitoxic serum will protect 1,000,000 grammes of guinea-pig against the minimum fatal dose of tetanus toxin.

¹ *Annales de l'Institut Pasteur*, 1893, ii, p. 64.

² See also *Lancet*, 1894, ii, p. 64, and *Cent. f. Bakteriologie*, xvi, p. 1074.

³ *Proc. Physiol. Soc.*, 1894, No. ii, p. xi.