

NOTE ON A CASE OF ARTIFICIAL PNEUMOTHORAX.

BY DR. W. HOLMBOE,

MEDICAL DIRECTOR OF MESNALIEN SANATORIUM, NORWAY.

THE following interesting case is that of an English medical graduate who was admitted to the sanatorium in the autumn of 1906 under the care of my predecessor, Dr. Sømme, and who allows me to send this note to THE LANCET. On admission there were signs of recent but extensive disease in the left lung, the right lung being then practically normal. During the following two years the patient was treated as an invalid, was largely confined to his bed, had considerable cough and expectoration, and subfebrile temperature. Besides the usual sanatorium treatment, rectal injections of Marmorek's serum and subcutaneous injections of tuberculin (Denys) were tried. The serum was a failure, but some improvement followed the tuberculin injections until the higher doses were reached, when the expectoration became more profuse, and lassitude and weakness followed. The tuberculin treatment was therefore given up. Early in February, 1909, the temperature was still subfebrile and the condition of the lungs was as follows. *Left lung*: Over the whole lung the normal resonance was absent on percussion. Over the second and third intercostal spaces the percussion note was "boxy." Behind there was dullness increasing towards the base. There was deficient air entry over the whole, and after coughing râles were audible everywhere. Over the base behind rhonchi and sibili could also be heard. *Right lung*: There was slight dullness over the apex in front and behind. Over the apex expiration was loud and prolonged. No adventitious sounds could be heard except over a small area at the angle of the scapula, where a few râles were audible.

As practically the whole of the left lung was involved and the prognosis was bad, treatment by compression or by artificial pneumothorax was decided on. Saugman's modification of Forlanini's nitrogen pump was employed. The hollow needle was inserted into the sixth space in the anterior axillary line. The manometric oscillations were well marked, showing a negative pressure of - 14 centimetres water on inspiration and - 6 centimetres on expiration. The eye of the needle was therefore clearly between the two surfaces of the pleura and nowhere else; 180 cubic centimetres of nitrogen were then admitted in three portions. The operation was followed by considerable dyspnoea and a dragging pain which caused a restless night in spite of an injection of morphine. Next day 275 cubic centimetres were injected, after which the pain gradually disappeared, but dyspnoea on the slightest movement remained very severe. The injections were repeated at intervals of two to three days at first. Later, when the pneumothorax became complete, the injections were given at intervals of one to two weeks, and after the treatment had lasted a year an interval of one month was allowed.

On the evening of the day of the first injection the temperature (rectal) rose to 100° F.; it then gradually fell to normal in the course of ten days. After confinement to his bed for three weeks the patient was able to get up and walk, although this caused considerable dyspnoea at first. Later this symptom largely disappeared, and even after a recent injection with a positive intrapleural pressure of 10 centimetres of water on expiration the patient was able to walk briskly on a flat road. The cough and expectoration decreased gradually and had completely disappeared by midsummer. Over the left lung the characteristic signs of a pneumothorax were present. The cardiac dullness was completely lost, and the heart sounds were distant and muffled. The limits of the left pleura extended to about two inches to the right of the middle line in front. The pneumothorax therefore was very extensive and overlapped the left margin of the right lung. The condition of the right lung has improved. A Roentgen photograph shows that the heart is completely displaced over to the right side of the chest where it is embedded in the right lung. The left lung is shown compressed from below upwards and to the right. By its apex it is still adherent to the surrounding structures. It is extraordinary that with the heart so much displaced and the only lung in use compressed by the heart below, by the pneumothorax in front and to the left, and by cicatricial

tissue in the apex, the pulse should be as low as 70 and that dyspnoea should follow only considerable exertion.

At the present time the patient is up all day, he has neither cough nor expectoration, his temperature and pulse are normal, and his weight is about 20 pounds greater than on admission. He works several hours a day, and in my absence has satisfactorily carried out my duties for several weeks. In spite of the fact that a private sanatorium admits a great number of cases in an advanced stage of the disease, the opportunities for applying this treatment are limited, as the disease is generally too extensive in the sounder of the two lungs. Twice pleural adhesions proved a bar to the treatment at the outset. In four cases the sounder of the two lungs was too much involved for any lasting good to result, and in four cases excellent results, similar to that described above, were obtained.

Lillehammer, Norway.

A DERMOID CYST OF THE TESTICLE ASSOCIATED WITH A NEW GROWTH.

BY F. J. F. BARRINGTON, F.R.C.S. ENG.,
HOUSE SURGEON TO ST. PETER'S HOSPITAL.

Clinical history.—The patient was aged 42 years, married, but had no children. He was admitted into St. Peter's Hospital on account of a swollen right testicle. The right testicle had always been larger than the left; when a child the patient remembered it being "pierced" by a medical man. The testicle had been gradually increasing in size for from three to four months. Beyond an aching in the groin when a suspender was not worn there was no pain. He had had two attacks of gonorrhoea, but denied having had syphilis. Before admission he had been treated as an out-patient for from three to four weeks with potassium iodide; in this time the swelling became larger owing to the development of a hydrocele.

On admission the vas and cord were normal. There was a solid enlargement of the testicle with a hydrocele of the tunica vaginalis; the epididymis could not be differentiated; the swelling was nowhere adherent to the skin. There was no testicular sensation, but slight tenderness on hard pressure. There was no palpable enlargement of the lumbar glands. The left testicle appeared normal. The clinical diagnosis rested between tertiary syphilis and a neoplasm. The testicle was explored by opening the tunica vaginalis, which contained about 5 ounces of clear, straw-coloured fluid. The testicle was found to be swollen and to have smooth bosses on the surface, which did not appear to be cystic. Orchidectomy was then performed in the usual way.

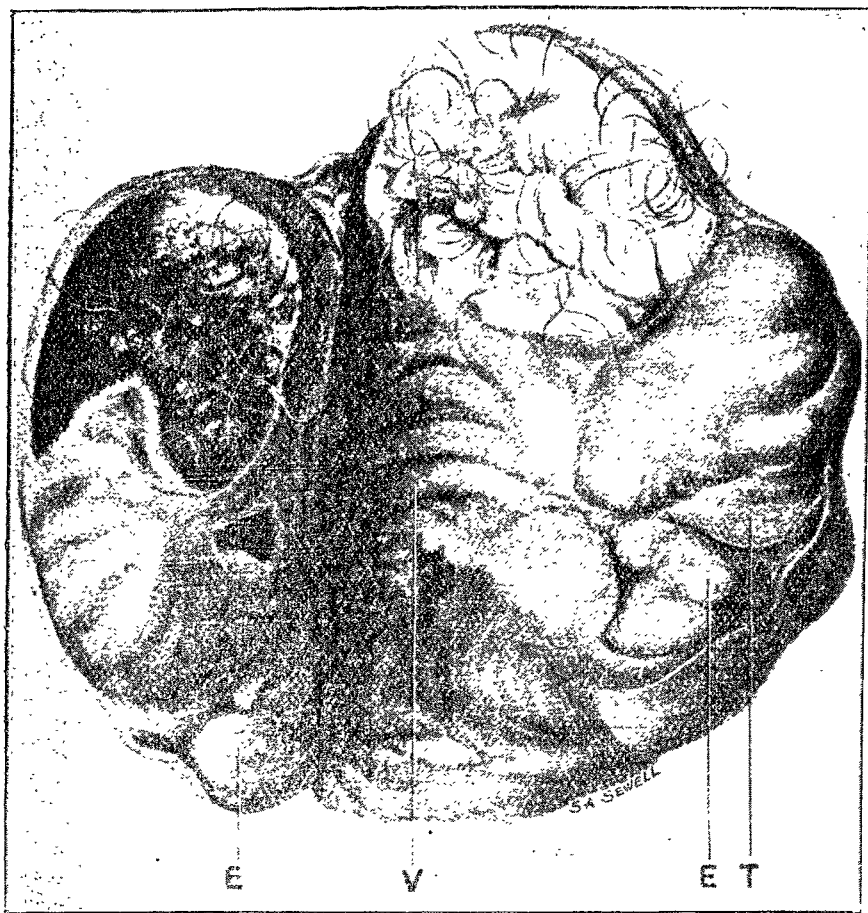
The patient was seen between six and seven months after the operation; he was then quite well and had no signs of local recurrence or secondary deposits in the abdomen.

Macroscopic examination.—The parts removed consist of the right testicle, tunica vaginalis, and about 3 centimetres of the spermatic cord (Fig. 1). The parietal layer of the tunica vaginalis has been incised vertically and everted. The tunica vaginalis is not thickened or congested; its surface is quite smooth, and there is no lymph deposited on it. The visceral layer covers a smooth, slightly bossy, oval swelling, measuring 8 by 5 centimetres, and occupying the usual position of the testicle. A vertical section through the swelling shows the following three structures contained within the tunica albuginea, from above downwards: a dermoid cyst, a lobulated new growth, and normal testicular substance.

The interior of the cyst measures 2½ by 4 centimetres; it is filled with a mixture of hair and white sebaceous debris. The hair is fair brown in colour, about the same as that of the patient. The interior of the cyst is roughly oval in shape, but there are two ridges projecting into it, one running transversely round the inner or left half of the cyst below its middle, and the other projecting upwards from the lower part of the cyst wall on its right side and running in a coronal plane; in the former ridge are some thin plates giving a bony sensation to the point of a metal instrument. There are no structures resembling teeth in the cyst.

The tunica albuginea passes off the cyst wall on to the growth. This is yellow ochre coloured and divided into

FIG. 1.



The contents of the dermoid cyst have been removed on the right side of the specimen. T, Testis. V, Vas. E, E, Epididymis.

lobules by trabeculae running in from the tunica albuginea and adjacent part of the wall of the dermoid. It appears to be more intimately connected with the wall of the dermoid above than with the testis below; the latter can be separated from it without cutting, whereas the former cannot. On the right side a series of cysts, many of which communicate with each other, intervene between the tumour and the wall of the dermoid. They contain a mucinous substance, and their walls, which have a cartilaginous feel, bear the same relation to the tumour as does that of the dermoid. The cavity of the dermoid has no communication with the cavities of these cysts.

The testis occupies the extreme lower pole of the swelling; it is wedge-shaped, and its section has the appearance of normal testis and measures $1\frac{1}{2}$ by 1 centimetres. The lower pole of the epididymis corresponds with the small wedge of normal testis, but the epididymis only extends about half-way up the swelling. Above this the tunica vaginalis is reflected off the posterior surface of the dermoid up to its upper pole. The cord and vas are normal.

Microscopic structure.—The dermoid cyst has a wall composed of laminae of fibrous tissue connected by areolar tissue in which are a fair number of vessels. In places there is a considerable small round-celled infiltration between the laminae. The lining epithelium has disappeared in some sections; in others it is seen to be a stratified epithelium with sebaceous and sweat glands resembling that of skin. It differs from skin in the following points: (1) Papillae are very poorly developed and in many places quite absent; (2) the number of sebaceous glands is greater; and (3) the horny layer is almost completely absent owing to the premature shedding of the cells.

A vertical section through the projection on

the inner wall of the cyst shows it to be a thickening of the dermoid wall. The epithelium of this is thrown into long folds, giving a villous appearance. Sections of one of the hard plates in this ridge, after decalcification, show very dense fibrous tissue with few cells, and do not present any appearance suggesting bone.

The tumour has an alveolar structure (Fig. 2). The stroma varies considerably in amount, and consists of rather dense fibro-areolar tissue. The alveoli vary in structure. On the one hand, an alveolus may consist of a single layer of short columnar cells with large, clear nuclei surrounding a narrow lumen which contains a shrunken mass of secretion staining deeply with hæmatoxylin. On the other, it may be irregular in shape, much larger, without any lumen, and with the peripheral cells only columnar, the inner ones being irregular in shape. In parts the cells have shrunk away from the stroma in hardening. The tumour has no true capsule anywhere; the tunica albuginea shows invasion by tumour cells in the form of strands lying between the fibrous laminae; this occurs to a less extent in the walls of the dermoid and the mucin-containing cysts.

The stroma of the testis is directly continuous with that of the tumour; in the transitional region it is rather thickened as if from mutual pressure; the alveoli of both testis and tumour are flattened at right angles to the plane of contact. There is a fairly sharp line of separation between the alveoli of the testis and those of the tumour, and no zone containing both exists. The mucin-containing cysts have very dense fibrous walls and a lining epithelium of two or three layers of flattened

cells; no goblet-cells can be seen.

Diagnosis.—The dermoid is situated within the tunica albuginea, and is therefore a dermoid of the testicle and not

FIG. 2.



Section of the tumour under a low power.

a dermoid of the scrotum attached to the testicle. The recent increase in size of the swelling was presumably due to the growth of the tumour. The tumour may have arisen (1) from the testicle, in which case the presence of the dermoid is merely a coincidence; (2) from the wall of the dermoid; or (3) from some tissue forming part of a teratoma.

1. The tumours with an alveolar structure occurring in the testicle are carcinoma and endothelioma. The carcinoma arising from the testis is of the spheroidal-celled variety; when the columnar-celled occurs it has arisen in the hypoblast of a teratoma. In endothelioma there are several layers of cells around the lumina, which are either blood or lymph spaces. It therefore seems unlikely that the tumour arose from the testis.

2. The tumour cannot be seen to reach the lining of the dermoid at any point, and the lining is continuous throughout; had it arisen from the lining it would have been a squamous-celled carcinoma. If the tumour arose from some appendage of the dermoid epithelium—e.g., sebaceous or sweat glands—one would expect it to show some signs of its presence within the cyst. Its cells and alveoli have very little resemblance to those of these appendages.

3. The last alternative—that the tumour has arisen in a teratoma from some hypoblastic structure—seems to have fewer arguments against it than the two preceding. It is true that other tissues—e.g., bone, cartilage, nervous tissue, &c.—so often found in testicular teratomata have not been found in the present case, but any examination short of complete destruction of the specimen is necessarily incomplete. The nature of the cysts containing mucinous substance is uncertain; they do not appear to be mere dilatations of the alveoli of the tumour, since no intermediate cysts are present and the fibrous tissue separating their epithelium from the cells of this tumour is as thick as that surrounding other parts of the tumour. The projection into the cavity of the dermoid, which has been described in other cases as having a different structure from the rest of the cyst, is absent in the present case.

In conclusion, I wish to thank Mr. J. G. Pardoe for his kindness in allowing me to publish the case.

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A CASE OF EXTRA-UTERINE PREGNANCY OCCURRING TWICE IN THE SAME PERSON.

By W. W. STAINTHORPE, M.D., B.S. DURH.

I READ with much interest in THE LANCET of July 9th, p. 101, Dr. G. A. Gordon's report of a case coming to his notice having the above heading. In a somewhat similar case to be described the two facts—(1) of the patient having given birth to a full-term child in the interval between the two extra-uterine pregnancies; and (2) that there was practically no cessation of menstruation in the second extra-uterine pregnancy—warrant me in recording it.

A married woman, aged 32 years, gave birth to a female child in 1900; she enjoyed good health and menstruated regularly until March, 1907, when she noticed the menstrual period lasted one month, during which time she experienced severe colicky pain in the left iliac fossæ, coming on at intervals and lasting in some instances a quarter of an hour and at others two or three hours; as the pain became more severe in character the discharge from the vagina became more profuse. On April 9th she consulted me for what she thought was "colic of the bowels." Upon examination a blood-stained discharge was found coming from the vagina. The os uteri felt soft and patulous, and the body of the uterus felt a little enlarged. In the left fornix a tender swelling of about the size of a small pear, distinctly separate from the uterus, was felt. As the pain during the

following ten days became more severe and more continuous, the tumour larger in size, and the discharge more copious, I diagnosed the case to be one of extra-uterine pregnancy, and had the patient removed to the North Ormesby Cottage Hospital, Middlesbrough, under Mr. H. D. Levick, who opened the abdomen next day and removed the distended left Fallopian tube, which upon examination was found to contain a tubal pregnancy of some six weeks' duration. The right ovary and tube were normal in appearance, and the uterus was only slightly enlarged. The patient made an uneventful recovery.

In February, 1908, the patient became pregnant, and in the following October gave birth to a full-time male child. Four months after the child was born the patient menstruated normally, and continued to menstruate normally each month until Sept. 13th, 1909, when she noticed that the period was one day later than usual. On the evening of the 14th a severe attack of abdominal colicky pain set in, accompanied by violent vomiting of bilious matter. A few hours after the pain commenced a slight sanguineous discharge appeared from the vagina. The patient kept in bed, and on the 14th sent for me after having passed what she thought to be a miscarriage. On examination of the supposed miscarriage I found it to be a complete decidual cast of the uterus. The uterus itself was much enlarged, the os uteri was soft and patulous, and in the right fornix could be felt a freely moveable mass, very tender to the touch and distinctly separate from the uterus. Remembering the patient's previous history, and the fact that the pain in this instance was of the same character, I came to the conclusion that one had again in all probability to deal with a similar condition taking place in the right Fallopian tube. This opinion was confirmed a few hours later, when the patient experienced a violent attack of abdominal pain occurring during the effort to pass urine. She became faint, collapsed and pulseless, and appeared to be *in extremis*. As immediate operation was out of the question the treatment resolved itself into the administration of cardiac stimulants by hypodermic injection and copious salines per rectum. In a few hours the general condition markedly improved and the patient had some refreshing sleep. Twelve hours after the immediate attack Mr. Levick again operated. Douglas's pouch was filled with recent blood-clot, which being cleared away brought to view the right Fallopian tube seen to be very much distended. No rupture of the tube could be found, and as no adhesions existed little difficulty was experienced in removing the mass, there being no active hemorrhage present. On examination of the tube and blood-clots it was found that a tubal abortion had taken place into the abdominal cavity through the abdominal ostium. The patient made an excellent recovery.

Guisborough, Yorks.

THE EFFECT OF RADIUM ON THE HEALTHY TISSUE CELL.

By G. PERCIVAL MILLS, M.B., B.S. LOND.,
F.R.C.S. ENG.,

RESIDENT SURGICAL OFFICER, GENERAL HOSPITAL, BIRMINGHAM.

THIS preliminary note is the result of some experimental work done on the comparative effects of radium on normal and malignant tissues. The mouse was chosen as a suitable animal in which to study the matter owing to the ease with which it can be inoculated with carcinoma. Here, however, only the effect of exposure to radium on the normal body cells will be dealt with. Since the liver is conveniently situated for application, the radium was applied over the anterior abdominal wall and the subsequent changes in the liver tissue were observed.

The applicator used was one of 500,000 units and was guarded by a shield which cut off the α and β rays, while allowing the more penetrating γ rays to pass through. It was applied for 30 minutes in each case. The mice were killed at varying intervals after exposure and the liver examined microscopically.

The earliest definite change noticed occurred about one hour after irradiation. The liver cells in this section were more granular than usual, and there were none of the clear glycogen-containing vacuoles which are present in the