On the structure of the corpus luteum. And An account of a foetus of seven months, with its placenta partially adherent to a naevus occupying the scalp and dura mater / By Robert Lee.

ON

THE STRUCTURE

OF THE

CORPUS LUTEUM.

AND

AN ACCOUNT

OF A

FŒTUS OF SEVEN MONTHS,

WITH ITS

PLACENTA PARTIALLY ADHERENT TO A NÆVUS OCCUPYING THE SCALP AND DURA MATER.

By ROBERT LEE, M.D., F.R.S.,

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FROM THE TWENTY-SECOND VOLUME OF THE MEDICO-CHIRURGICAL TRANSACTIONS, PUBLISHED BY THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY OF LONDON.

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1839.

ON

THE STRUCTURE

OF THE

CORPUS LUTEUM.

By ROBERT LEE, M.D., F.R.S.

READ JUNE 11TH, 1839.

The Graafian vesicle in the human ovarium is a small spherical pellucid sac, which contains a fluid, the ovum, and the granular substance in which it is imbedded. The vesicle itself always consists of two distinct coats or membranous layers, which adhere firmly together. The external surface of the Graafian vesicle adheres loosely to the stroma or proper substance of the ovarium, in which it is imbedded by soft cellular substance, blood-vessels, and nerves.

Soon after impregnation, the coats of the Graafian vesicle and the peritoneum covering it give way by absorption, the contents of the vesicle escape, and between its outer coat and the substance of the ovary, the corpus luteum is gradually formed.

The observations of De Graaf, Haller, and others, have proved that a corpus luteum is invariably formed after impregnation in the situation of the Graafian vesicle, from which the ovum had escaped; but whether the corpus luteum is produced by a thickening of the inner layer of the vesicle, or is an entirely new substance deposited between its coats, or around its external surface, and whether corpora lutea are not formed in the ovaria of some women who have never been pregnant, physiologists have hitherto been unable to determine.

Professor Baer is of opinion that the corpus luteum is formed in all animals by a thickening of the inner membrane of the Graafian vesicle. "De corporis lutei genesi satis dissentiunt observatores. Me judice minimè corpus novum est, sed stratum internum thecæ magis evolutum. Quod sequentibus observationibus demonstrari posse puto.*

Dr. Montgomery believes that the corpus luteum is formed between the coats of the Graafian vesicle, and does not consist, as Baer has supposed, of a thickening and puckering of the inner layer of the vesicle. "It will appear," he observes, "very obviously from the above description, that I believe the corpus luteum to be surrounded externally by the outer membrane of the Graafian vesicle, while its cavity is lined by the inner membrane of this vesicle; the corpus luteum being, in fact, enclosed

* C. E. Baer, De Ovi Mammalium et Hominis Genesi. Lipsiæ 1828, p. 20.

between these two membranes, and its substance pervaded by the small vessels passing from the outer to the inner. Of this I have reason to be satisfied, and I would not have deemed it necessary to insist on it, but that a different account is given on the high authority of Baer, who thinks that the corpus luteum is not a new body, but merely the inner coat of the Graafian vesicle in a state of greater development, which appears to be the opinion of Valentin also. Now the fact is, that it lies around and outside of the inner membrane of the vesicle, which is to be seen distinctly forming its central cavity at earlier periods, and by the collapse or approximation of its opposite surfaces, afterwards gives rise to the radiated white line which remains an essential distinctive character of the true corpus luteum at every subsequent period at which this body is still visible."*

On the 11th of July 1838, a woman, two months advanced in pregnancy, died of continued fever, in St. George's hospital. The uterus and its appendages were presented to me on the 12th, by Dr. Macleod, and the following is a short description of the left ovarium, which contained the corpus luteum. It was larger than the right ovarium, and had a considerable prominence on its convex edge, around which were seen ramifying a number of minute arteries and veins. There was a small circu-

* An Exposition of the Signs and Symptoms of Pregnancy, by W. F. Montgomery, M.D. London, 1837. p. 218.

lar depression at the point of this prominence, but a bristle could not be made to pass through it into the substance of the ovarium. On cutting open the ovarium, the corpus luteum presented itself of an oval shape and deep orange colour, with a small cyst in its centre, resembling the Graafian vesicle, with its coats thickened and contracted. With little difficulty I succeeded in separating one half of this cyst into two distinct layers, which appeared to be the two coats of the Graafian vesicle.

The outer surface of this cyst is so loosely attached by cellular tissue to the corpus luteum, that it can easily be separated from it. The corpus luteum itself varies from a line to a line and a quarter in thickness, and when examined with a magnifier, appears to consist entirely of small yellow globules or particles contained in cellular membrane.

Around the outer surface of the corpus luteum, and completely investing it, there is a white layer varying in thickness, the outer part of which loses itself in the substance of the ovarium, of which it appears to form a part, and to be similar in structure, having the mouths of divided vessels distinctly perceptible, as in other parts of the substance of the ovarium. The inner portion of this white layer, which appears to be condensed stroma, is separable on the one hand from the corpus luteum, and on the other from the substance of the ovarium, so as to give the appearance of a distinct membrane, considerably exceeding in thickness both layers of the

Graafian vesicle. Plate VII. fig. 1 exhibits the colour and form of the corpus luteum when first cut open, with the Graafian vesicle in its centre.

The Graafian vesicle is also enclosed within the corpus luteum, in a specimen of Fallopian tube conception of six or seven weeks, in my collection.

In another specimen of more advanced tubal conception, the Graafian vesicle is likewise seen enclosed within the corpus luteum.

The same fact is fully as evident in the preparation of the gravid uterus of ten weeks, in my paper on the membranes of the human ovum in the 17th volume of the Transactions of the Society; and in several of the preparations of the gravid uterus in the Hunterian Museum, the Graafian vesicle is also contained within the corpus luteum, and forms its central cavity.

From these observations on the corpus luteum soon after impregnation, we may conclude that it is neither produced by a thickening of the inner layer of the Graafian vesicle, nor by a deposit of a new substance between its two coats, but that it is formed around the outer surface of both these coats of the Graafian vesicle, and that the stroma of the ovarium is in immediate contact with the external surface of the yellow matter.

As gestation advances, the deep yellow colour of the corpus luteum fades, and the Graafian vesicle in its centre contracts and assumes a peculiar white membranous appearance, with small bands passing outward through the substance of the yellow matter,

like the radii of a circle. See the drawing of a corpus luteum seven months after conception. (Fig. 3.)

The corpus luteum has almost completely disappeared, and the ovarium returned to its natural size about three months after parturition. A small depression on the surface, and a slender white line running into the substance of the ovarium, are all the traces of the corpus luteum which remain in an ovarium three months after delivery.

In the ovaria of women who have never been pregnant, yellow oval-shaped bodies are frequently found, which it is difficult to distinguish from true corpora lutea.

In the greater number of spurious corpora lutea, as Dr. Montgomery has observed, the appearances are produced by blood extravasated within the Graafian vesicles, which assumes a fawn hue as the colouring matter disappears by absorption, and undergoes various changes, similar to those which are observed to take place in coagula of blood formed in the cavities of veins from inflammation of the coats or mechanical obstruction. After a longer or shorter period, the blood is entirely removed, and the coats of the vesicle contract, and often assume a brown, yellow, or black colour. In these false corpora lutea, the yellow matter is contained within the Graafian vesicle, and does not form around it, as true corpora lutea are always observed to do.

In advanced life a thickening of the layers of the Graafian vesicle not unfrequently gives rise to appearances resembling corpora lutea. These, and all

other false corpora lutea, are generally found deeply imbedded in the substance of the ovarium, or, if they are near the surface, they are not actually in contact with the peritoneum, but have a small portion of stroma intervening. If there is a cicatrix over these, it has an irregular form, very unlike the small circular aperture always seen in the peritoneum covering the true corpus luteum. Besides, in true corpora lutea there are always bands running from the outer surface of the central capsule to the stroma, surrounding the yellow substance of the corpus luteum.

In the ovaria of women who have died during menstruation, appearances have also been observed, which might easily have been mistaken for true corpora lutea.

On the 18th of November 1832 I examined the uterus and the ovaria of a young woman who had died suddenly the preceding day, when the catamenia were flowing. Both ovaria were larger than usual, and the Fallopian tubes were red and turgid. The peritoneal coat of the left ovarium was perforated at that extremity nearest the uterus by a small circular opening, around which the surface of the ovarium was elevated, and of a bright red colour. When cut into, the substance of the ovarium around had a fawn colour.

On the 14th of January 1837, a woman thirty-seven years of age, who had long suffered from hysteria, died suddenly in St. George's Hospital, during menstruation. No morbid appearance was

found to account for her death. A small circular aperture was observed in the peritoneum of the left ovarium, near the point where the corpus fimbriatum is fixed to the extremity of the ovarium. This opening communicated with a cavity in the substance of the ovarium, which was surrounded with a soft yellow substance, of an oval shape. The distinctive characters of the true corpus luteum were wanting.

From all the observations hitherto made upon the true corpus luteum, we may conclude that it is never formed but as a consequence of impregnation. The yellow oval-shaped substances found in the ovaria of women who have never been pregnant, are produced by morbid states of the Graafian vesicles, and are essentially different in structure.

P.S. On the 27th of July 1839, a lady, 29 years of age, died in the second month of her first pregnancy; and I inspected the body on the 29th, with Mr. Jorden of Lower Belgrave Street. The right ovarium contained the corpus luteum, from which there escaped about a small tea-spoonful of yellow serous fluid when it was cut open. On the 30th of July, I examined the ovarium and corpus luteum with Sir Astley Cooper and Mr. Wharton Jones, and the result is, that the correctness of the view which has been taken of the structure of the corpus luteum in this paper is now put wholly out of doubt. From the preparation of the part and the fac simile made of it by Mr. Jones, it is evident that no capsule surrounds the yellow matter, but that

the outer surface of the yellow matter is in immediate contact with the stroma, or proper tissue of the ovarium. It further clearly appears, that both the layers of the Graafian vesicle are within the yellow matter, that the innermost of these layers is smooth, and the outer layer rough and filamentous, and that processes are sent out from this exterior layer which penetrate the yellow matter to a considerable depth, and in some parts go quite through it to the stroma of the ovary. The peculiar convoluted appearance of the yellow matter is also distinctly seen. (See Pl. VII. fig. 2.)

April 19, 1839.
14, Golden Square.

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READ FEBRUARY 12TH, 1839.

The following letter, which I received on the 23rd August 1838 from my late pupil Mr. William Highmore, explains the object of the present communication:—

"Sherborne, Dorsetshire, August 21, 1838.

"My dear Sir,

"I have the greatest pleasure in sending you a curiously malformed fœtus, which was expelled from a lady in the seventh month of gestation, in my uncle's practice, yesterday. My uncle was sent for; but, being from home, and the case being urgent,

another practitioner was called in: who, on his arrival, found the head of the child born; the body and placenta were then expelled together, I suppose; and the funis was divided before it was discovered that it was adherent to the forehead. When my uncle arrived, he found the labour over, and the lady comfortable; the gentleman who attended her being still with her. On examining the child, which appears to have died during the delivery, he discovered that the funis, which was very short, was firmly adherent to the forehead, the skin of which is very vascular, and the other malformations of the face and hands, which you will see. The head was not examined, in order to give you an opportunity of doing with it as you think proper. I am sorry it is not in my power to give you the history of the case now, but will procure it for you before I leave the country. Mrs. ——, it appears, was frightened, about the period of quickening, by a cat leaping on her head as she was stooping down to tie her shoe.

"Believe me, my dear Sir,

"Yours very truly,

"WILLIAM HIGHMORE.

"To Robert Lee, Esq., M.D.,
14, Golden Square, London."

The fœtus and placenta, having been enclosed in a bladder half filled with water, arrived without injury, and before decomposition had commenced. They were placed in a vessel filled with water, while

Mr. Joseph Perry was engaged in making the drawing presented to the Society. A pipe was then introduced into the umbilical vein of the divided extremity of the cord connected with the placenta, and all its veins and arteries were minutely injected. The arteries and veins of the fœtus were then filled with injection from the extremity of the umbilical vein connected with the navel. The integuments of the head were then divided from ear to ear, and the dura mater was found in immediate contact with these, and all the bones of the upper part of the head were wanting. The scalp and dura mater on the upper part of the head were almost wholly occupied with a great plexus of dilated arteries and veins, filled with injection, and presented the appearances usually observed in cases of nævus, spread over a considerable portion of the surface of the body. The arachnoid and pia mater had nothing unusual in their appearance, and the brain was perfectly healthy.

Being anxious to determine the exact structure of the band uniting the placenta and forehead, near the root of the nose, and to ascertain whether any connection, by blood-vessels, existed between them, I availed myself of the kindness of Sir Astley Cooper to examine the parts carefully along with him. We found this band about three quarters of an inch in breadth, and an inch and a half in length, composed of the amnion and chorion, which passed off from the placenta, near the entrance of the umbilical cord, and were firmly inserted into the integuments of the forehead, as the amnion and chorion, which

form the sheath of the umbilical cord, are usually united to the integuments around the navel of the child.

We also found an opening sufficiently large to admit the point of a finger, through the integuments of the forehead, where they were united to the amnion and chorion; and, through this opening, the dura and pia mater protruded, and were lodged in the centre of the band, forming at the part a hernia cerebri, of which the band, extending between the placenta and forehead, was the only covering.

We could not discover any arteries or veins, either empty or filled with injection, running in the cellular membrane of this band, and therefore concluded that no vascular communication existed between the placenta and fœtus at this part.

Near the root of the nose there was an irregular shaped opening on the left side, and both eyes were wanting.

There were only three fingers and a thumb on the right hand, and the fore and ring fingers of the left hand were imperfectly formed.

All the thoracic and abdominal viscera were healthy.

The umbilical cord measured about six inches.

That the adhesion of the placenta to the head of the fœtus, in this case, was not accidental, nor the consequence of inflammation, must be obvious to all; but at what stage of the development of the embryo it took place, and by what process it was effected, it will perhaps be impossible to determine,

until a more perfect knowledge of the origin of the amnion is obtained. The umbilical cord and band must have been formed at the same time, when the embryo and amnion were in immediate contact, and probably before the end of the third week after conception.

Paul Portal has described and figured a malformed fœtus, between the integuments of whose forehead and the placenta there passed a long slender band, formed of the amnion and chorion; the eyes of the fœtus were closed and deformed; the feet clubbed; the ring-finger of the right hand was wanting, and the left arm lame and incapable of extension. Portal has offered no explanation of the manner in which this adhesion between the placenta and fœtus was formed, and concludes the history with this observation: "L'on voit souvent des choses surprenantes dans les accouchemens, et on peut dire que la nature se joue dans la génération."*

In Mr. Pole's case of extraordinary malformation in a fœtus, the bones of the head, above the orbits, were almost entirely deficient. "The most extraordinary circumstance in this case," he observes, "is the attachment of the placenta to the upper part of the child's head, which was not by a mere membranous union, but of its more solid and compact parts. The largest portion of the placenta lay over the occiput and scapulæ, and extended considerably to the right and left side of the head; so that in viewing the child, as I have represented it in

* La Pratique des Accouchemens. Paris, 1685. p. 192.

the drawing, its internal surface only is seen, with the upper edge bent backward. This attachment of the placenta was principally towards the right side of the head."*

Mr. Carrs has related a case of monstrosity in which the bones of the cranium were wanting, and likewise the brain and medulla oblongata. A rigid membranous open pouch, coming from the scalp, hung down on the back. The orbitar processes, in that part which form the nasal, were perfect, and also the mastoid and zygomatic. The face was regularly shaped; but the eyes seemed to stand on the top of the forehead, from the failure of the cranium.

"A portion of the membranous part of the placenta was united to the scalp above the left eye; the funis was not more than three inches in length. There was no clavicula, scapulæ, humerus, or any arm on the left side. The dorsal vertebræ were much distorted. There was a deficiency of the peritoneal covering of the epigastric region of the abdomen. The liver and small intestines protruded from the cavity on the left side, and the large ones were distended with meconium. The right foot was inverted. The features, the extremities, and parts of generation, were large in proportion to the size of the monster. The mother could not attribute this malformation to any particular cause."†

Geoffroy St. Hilaire has given a representation of

* London Med. and Physical Journal, vol. iii. p. 397. 1800.

† Med. and Phy. Journal, vol. vii. p. 385. 1802.

the appearances observed in a case which occurred to Monsieur Duchateu, in which an aponeurotic membrane confined the head to the placenta. The placenta was attached to the back part of the left side of the head. The cord was twisted, and adherent to itself, near the placenta, similar to what was observed in the cord near the umbilicus in the case I have related.

The most remarkable band was stretched between the head and placenta. It occupied, on the left side, a considerable extent, as a prolongation of the dermis. This membrane was so strong, that it did not tear during the birth of the child. M. Geoffroy St. Hilaire has not offered any particular explanation of the manner in which these bands were formed.*

In a memoir presented by Monsieur Bonfils, of Nancy, to the Royal Academy of Medicine, a description is given of a female malformed fœtus, born about the fifth or sixth month of pregnancy, having the head very much inclined to the left, and an extensive adhesion existing between it and the placenta. The thoracic and abdominal viscera were malformed and displaced, and likewise united to the placenta by membranous bands. The following is the account given by Breschet of this case :—

The centre of the internal surface of the placenta was adherent to the whole of the left side of the cranium, and covered, likewise, the nose, left eye, and

* Anatomie Philosophie, tome ii. p. 151-203.

the half of the forehead of the same side. The amnion and chorion furnished loose bands, which extended to the left side of the neck, and anterior surface of the thorax. There was a fissure from the neck to the navel, along the anterior part of the trunk in the median line, which left uncovered the greater part of the organs of the chest and abdomen. The lungs, covered by the pleura, and the thymus, had preserved their natural form and relations; but the heart, which was unusually lengthened, had a transverse direction, with the base turned backward and to the right, and the apex turned upward, and to the left. The point of the heart had contracted attachments with the bands sent off from the placenta, and by these it was drawn out of the thorax upon the superior part of the anterior surface of the walls of this cavity, and intimately adhered to the anterior part of the head. It had formed, likewise, connexions with the liver, by a band stretching between these two organs. The pericardium, which was open in front, appeared to be in a great part wanting. The cranium had sunk down considerably, in consequence of the absence of the brain, so that the band which went to the cranial bones, though only an inch and some lines in breadth, embraced almost the whole of the left side of the head. It covered the sides of the nose, the left half of the forehead, eye, temple, and the whole of the left side of the head to the neck. It was further continued into the membranous folds on the left side of the neck, and descended along with them on the superior part

of the thorax. There these membranes became united to the placental extremity of the umbilical cord, which, about two inches and a half in length, proceeded also from the centre of the placenta under the bands, adhered to the left side of the trunk by other bands extremely short, and went to terminate at the umbilicus.

The soft parts of the face and cranium were so confounded with the placenta, and the bands were so short, that it was impossible to separate them without affecting one or other of the parts united together. At the neck and thorax, these bands were from eighteen to twenty lines in length, and allowed the placenta to be separated from the parts which it covered.

Mons. Breschet has referred all the appearances observed in this case to arrest of development, without explaining the precise manner in which this could have given rise to all the various malformations which existed in the different viscera.*

Mons. Lauray transmitted the details of another case to the Royal Academy, in which the placenta adhered to the scalp of the child, through a great extent of its surface. The head was flat at the anterior and superior part, where the os frontis and superciliary ridge were wanting, and the brain covered by integuments projected above the site of the right eye, which was also wanting. There was a double hare-lip. The child lived thirty-two hours,

* Repertoire d'Anatomie, tom. ii., P. I., p. 28.

and no attempt was made to separate the placenta from the head, to which it adhered over a great part of its surface. M. Lauray remarks, that this unnatural adherence took place, "sans qu'on peut soupçonner ni la cause ni la manière dont elle s'était établie."*

* Nouveau Bibliotheque Medicale, 1829.

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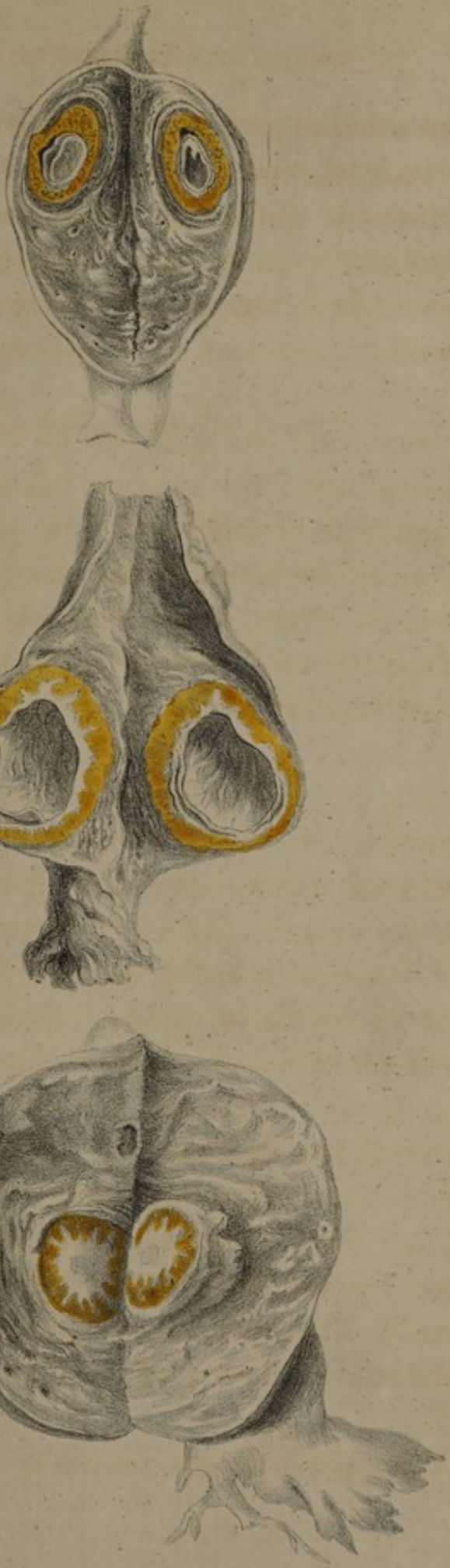

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