CHAPTER VII.

MALFORMATIONS OF THE UMBILICUS AND URACHUS.

FAULTY CLOSURE OF THE VITELLO-INTESTINAL DUCT AND ITS RESULTS.

The vitello-intestinal duct, by which the intestinal canal of the embryo communicates with the yolk-sac, and which usually disappears at about the eighth week of fœtal life, may persist and result in a number of abnormalities, such as a fistula or a diverticulum, or a cyst.

When the stump of the umbilical cord falls from an infant a few days after birth, it may expose an open vitello-intestinal duct. This duct will appear as a fine fistula secreting a few drops of mucus; or, if the duct is connected with the intestine, the secretion may possess a fecal character. Such a communication is always placed above the ileocæcal valve; and if the latter is narrow or impervious, the fecal secretion from the umbilicus will be proportionately large. The condition is then called a congenital umbilical anus.

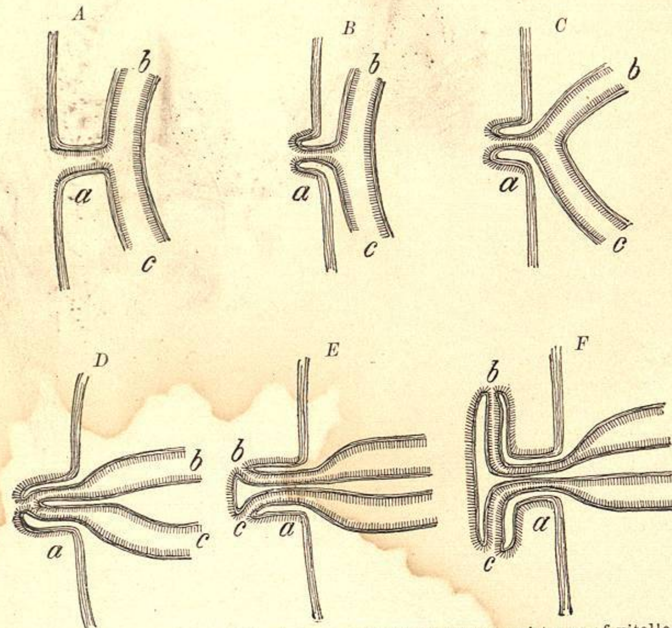
A vitello-intestinal fistula may develop some time after birth. If the duct terminates blindly at the umbilicus, its opening may be due to superficial inflammation or to the gradual accumulation of fluid which may burst outward under the influence of increased abdominal pressure (coughing, crying, etc.). Sometimes the duct extends for some distance into the umbilical cord and may be opened when the cord is severed at birth. A fistula of this character may be complicated by prolapse of the intestine, as is shown in Fig. 52.

In the most marked conditions the prolapsed intestine appears at the navel as a flat tumor with a relatively slender pedicle. The tumor is covered externally with mucous membrane, which is the lining of the vitello-intestinal duct. This mucous membrane joins with the skin of the umbilicus on one side and with the mucous membrane of the small intestine on the other. If the tumor is cut off, two intestinal openings are seen which have no connection with one another. If the intestinal contents cannot escape from the umbilicus, such an infant must necessarily die of fecal obstruction. This condition of prolapsed intestine may be associated with that of umbilical hernia.

If the vitello-intestinal duct is closed inside the abdomen but persists in the umbilical cord, after the latter falls off there will remain a tumor discharging mucus from its surface, but which shows no fistula. Such a condition has received the name of enteroteratoma, but a more natural term is prolapse of the mucous membrane of the remains of the vitello-intestinal duct.

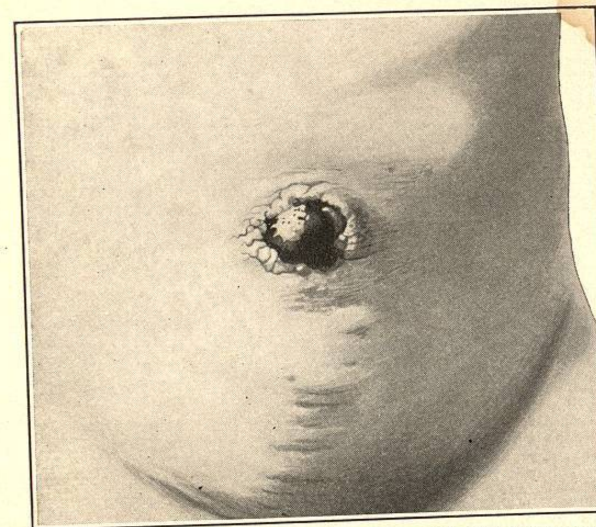
If the duct is closed at the umbilicus, but is open within the abdomen, two conditions are possible: if it communicates with the

Fig. 53.



A, B, C, D, E, F, congenital umbilical abnormalities showing persistence of vitello-intestinal duct and the possible relations of intestine and umbilicus: *a*, abdominal wall; *b–c*, lumen of intestine. (Barth.)

Fig. 54.



Enteroteratoma measuring 2.5 by 2 cm. (1 inch), and covered with mucous membrane. The tumor was solid and contained no fistula.

intestine, a diverticulum will result; and if it is shut off from the intestine, a cyst may form. Both of these conditions are more serious than a simple external fistula, which does not communicate with the intestine.

A fistula of the vitello-intestinal duct will be recognized on inspection as soon as the cord falls off. There persists a small moist reddish tumor made up of pouting mucous membrane which gradually increases in size and discharges either mucus or mucus and feces. In the latter case a fine probe may be passed through the fistula into the intestine. If the fistula discharges mucus only, it must be differentiated from a urachal fistula and from the rare gastric fistula. The mucus discharged from the last-named fistula is of acid reaction and digests the tissues around its mouth, giving rise to an ulcer.

Radical treatment of a vitello-intestinal fistula aims to correct the abnormal attachment of the intestine to the umbilicus. The umbilical ring is divided and the little tumor is drawn forward and separated from the surrounding tissues until it can be brought out of the wound together with the attached portion of the intestine. The attachment to the intestine is then severed, the wound in the intestine sutured, the intestine replaced in the abdomen, and the peritoneum at the umbilicus sutured. The umbilical ring and the gap in the skin are also closed by sutures. If the condition is complicated by an umbilical hernia, it may be better to cut around the umbilicus to open the peritoneal cavity at one side so as to examine the parts from within, to free and close the intestine, and after removal of the umbilicus to close the abdominal cavity. An operation of this character is not a trivial one for a young child, and hence it is not usually attempted when the fistulous discharge is purely mucus or contains only faint traces of feces. Under such circumstances the fistula should be cauterized and the prolapsed mucous membrane kept back by a strip of adhesive plaster. A radical operation may be performed at a later date. If the prolapse is more marked, an operation is imperative.

A diverticulum of the vitello-intestinal duct is seen oftener in male than in female infants. It forms a small-pedicled red tumor which gradually projects more and more from the umbilicus until it reaches the size of a raspberry. It is covered with mucous membrane which passes into the normal skin at the base of the pedicle. There is no fistula connected with it. This point is of importance, since such a diverticulum has been cut off under suspicion that it was a granuloma. Such treatment will open the peritoneal cavity and possibly wound the small intestine. The distinguishing mark of a diverticulum is the mucous membrane which covers its surface. This must be entirely removed in order to prevent recurrence. The pedicle should be carefully ligated to prevent hemorrhage.

A cyst of the vitello-intestinal duct is such a rare condition that it need not be described in detail.

MALFORMATIONS OF THE URACHUS.

Another structure of the fœtal period whose relation to the umbilicus may persist and give rise to abnormal conditions is the duct by which the urinary bladder communicates with the allantois. This duct is called the urachus. In a normal child its remains are seen in the median vesico-umbilical ligament, which cord is often pervious in places. If one of these hollow portions becomes distended, a retention-cyst will be formed. Such a cyst will be situated approximately in the median line and will lie in front of the peritoneum.

An umbilical urachal fistula may be produced by the falling off of the stump of the cord in case the urachus is pervious for a certain distance. Some observers believe that the lumen of the urachus is preserved in case phimosis or some other narrowing of the urinary outlet increases the tension within the bladder. This opinion needs confirmation. The opening of a urachal fistula in the umbilical sac may be so large that a considerable portion of the bladder protrudes through it. The amount of urine discharged from the fistula will vary according to its size. The flow may be continuous or merely a few drops may appear when abdominal pressure is increased. If this fluid is clear, it will be easily recognized as urine; if it contains pus, it will be necessary to differentiate the urachal fistula from an umbilical abscess. The prognosis of an urachal fistula is favorable. A cure has often followed cauterization and continued pressure with a bandage. If the fistula is not discovered until its mucous lining has become everted, it must be freshened and sutured. Any prolapsed tissue should be cut away. It is, of course, necessary to be sure that urine flows freely through the natural channels.

Besides this congenital form of fistula there is another which develops months or even years after birth. This condition is brought about by difficult urination aided apparently by inflammation of the bladder. Such inflammation extending upward through the lumen of the urachus develops into an abscess which ruptures at the umbilicus and discharges at first pus and later pus and urine. Such a condition can scarcely be differentiated from a urinary abscess which ruptures at the umbilicus. Indeed, a positive differentiation can only be made in case urachal epithelium is found lining some portion of the wall of the abscess.

Treatment.—Treatment should accomplish three objects: 1, it must overcome any obstruction to the normal passage of urine; and 2, cure existing cystitis (for fistula of the bladder will not close while the organ is inflamed) before, 3, attempting to cure the umbilical fistula. Any operation to be successful must recognize the anatomical relations of the dilated urachus. When the two first requirements have been complied with, an incision is made around the umbilical fistula and the urachus is dissected free to its insertion in the bladder. There it is cut across and the wound in the bladder carefully sutured. The remains of the urachus are removed and the wound in the abdominal wall sutured except at its lower angle, where a small gauze drain is left.