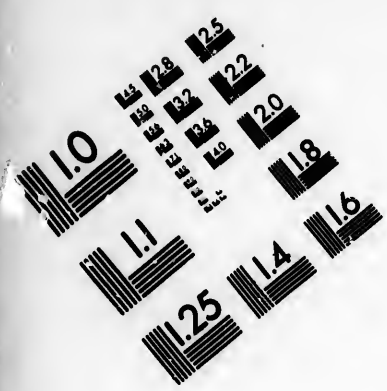

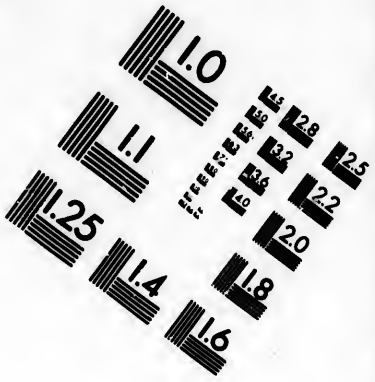

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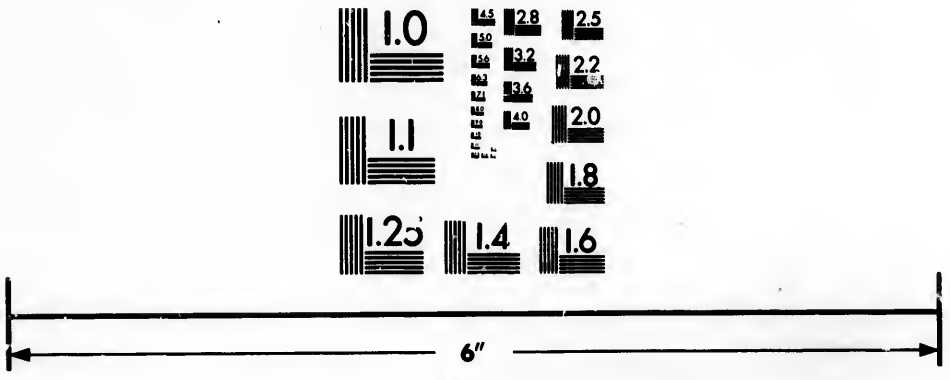

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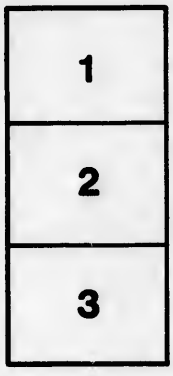

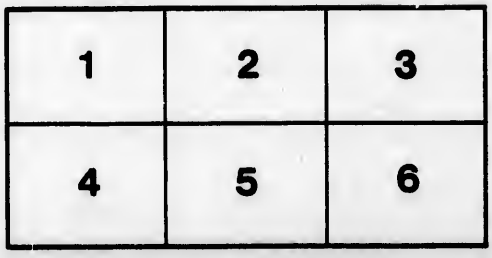

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NECROSIS OF THE BLADDER.

A Paper Read before the Medico-Chirurgical Society of Montreal.

BY

F. A. L. LOCKHART, M.D., &c.,

Fellow in the Obstetrical Society of Edinburgh; Late Clin. Assistant in the Gynæcological Wards of the Edinburgh Royal Infirmary.

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NECROSIS OF THE BLADDER.*

By F. A. L. Lockhart, M.B., &c.

Fellow of the Obstetrical Society of Edinburgh; Late Clin. Assistant in the Gynæcological Wards of the Edinburgh Royal Infirmary.

Mr. President and Gentlemen,—The exact pathology of inflammation of the walls of the bladder, going on to separation of the whole or patches of the wall, and involving one or more of its coats, seems to be involved in so much obscurity, that I think every case coming under our observation should be minutely examined into and discussed in order to bring about some degree of unanimity upon the subject, in its nomenclature at all events. It is for this reason that I have ventured to bring before your notice this evening the following case, which was under my charge in the Edinburgh Infirmary, together with a few remarks upon the subject of necrosis of the bladder.

CASE REPORT.

A. N., single, aged 28 years, waitress in a hotel, was admitted to ward 28, R.E.I., on April 27th, 1890. On admission, she complained of frequency of micturition, with a burning pain during the act, and a bearing-down pain, which was especially bad just after the bladder was emptied.

History.—The patient had a child two years previous to admission, the symptoms coming on just after the labor, which was very protracted. Labor pains began on a Monday, but the process was not completed until the following Friday, when a

* Read before the Medico-Chirurgical Society of Montreal.

doctor was called in, a midwife having been in attendance until that day! The following is his own account of the case: "When I arrived I found that uterine inertia had taken place, the os was fully dilated, but the head was retained at the brim. Before I saw her, she had frequent calls to micturate, which made passing the catheter unnecessary. I applied the forceps and delivered with difficulty, requiring a great amount of traction. The perineum was badly ruptured. I wanted to suture, but the patient and those about her objected on the plea that she had suffered enough already. There was marked incontinence of urine during convalescence, but this improved materially as she grew stronger, though up to the time when I last saw her she complained of it, and found it to greatly interfere with her work." (He then goes on to apologise for his scanty notes of the case, as she was not a regular patient of his.) The improvement continued until she could retain her urine for three hours during the day, but during the night she had to pass it every few minutes. In two months this improvement ceased, and she got steadily worse up to the date of her admission. The urine has always been very hot, irritating and thick, with a deposit on standing.

State on admission.—The patient makes water every few minutes, during both night and day, but especially often at night. The urine is alkaline in reaction, thick, and deposits pus and phosphates on standing. On making a local examination, the perineum was found to be torn to within half an inch of the anus. The cervix and uterus were normal. The sound only passed four inches into the bladder, and the meatus urinarius was very tender.

Treatment.—This consisted in washing out the bladder once a day with a warm solution of carbolic acid (1–60), together with internal medication, giving belladonna, hyoscyamus, buchu, and half an ounce of a saturated solution of boracic acid three times a day.

On June 12th an attempt was made to repair the perineum by Tait's method, so the local treatment of the cystitis had to be discontinued. As incontinence of urine came on the day after

the operation, the tissues became so sodden that the stitches would not hold.

On July 5th the incontinence was still present. During the previous night the patient suffered from intense pain in the hypogastric region, and about 8 A.M. passed two pieces of membrane, together with a quantity of granular and fibrous débris, per urethram. The incontinence lasted for about two weeks after passing the membranes, but since then she steadily improved under the above treatment, which was resumed a few days after the membranes were passed. The patient was now very weak, so general tonics were added.

On Sept. 6th she left hospital, being practically cured of her bladder trouble, as she could retain her urine as long as she chose.

Description of Membranes.

(*a*) *Macroscopic.*—The pieces of membrane passed were roughly ovoid in shape, being smooth on one side and rough on the other. One piece was about the size of a silver dollar, while the other was about half that size, the thickness varying from $\frac{1}{10}$ to $\frac{1}{32}$ inch.

(*b*) *Microscopic.*—Four layers may be made out, but they have no definite lines of demarcation. They may be named as follows: 1. Fibrous. 2. Fibro-granular. 3. Vascular. 4. Musculo-granular.

The *fibrous* layer is composed of elastic and connective tissue fibres running longitudinally. This layer is very thin, and is entirely wanting at some parts.

The *fibro-granular* layer, as its name implies, consists of fibrous and granular material. The fibrous element is composed of both white fibrous and yellow elastic tissue, the latter being scattered throughout the layer. The white fibrous tissue runs in different directions through the specimen, the bundles interlacing with each other here and there. Some of the bundles are large and dense, while in other places only a few fibres are to be observed. The granular material fills up the spaces between the bundles. This contains some connective tissue corpuscles, but in most places the tissue is so degenerated as to be

unrecognizable. In patches here and there, it is even hyaline. This layer merges rather suddenly into the next, viz.,

The *vascular* layer, which contains most of the blood-vessels. These vessels are both numerous and congested, a few being thrombosed. More or less extensive hemorrhages have taken place into the perivascular tissue, which is very granular.

In the fourth or *musculo-granular* layer, muscular tissue may be seen in various stages of degeneration. In one or two places it appears as bundles of fairly normal tissue, but the bundles are isolated in the midst of granular débris, the tissue here being very open in structure.

Structure of the Normal Bladder.—As all here are well acquainted with the structure of the normal bladder, I will dismiss it in a few words.

1. When the bladder is distended, the peritoneal coat extends over the superior and posterior surfaces, as well as the upper parts of the sides, but when the organ is collapsed, it merely covers its upper aspect.

2. The sub-peritoneal coat consists of areolar tissue, and is of varying thickness.

3. The muscular coat consists of three layers, viz., external longitudinal, middle circular, and internal longitudinal. Of these three layers, the first two are well marked, but the last is poorly developed, and at parts some fibres run obliquely.

4. The submucous coat consists of areolar tissue, together with elastic and connective tissue fibres. This coat contains most of the blood-vessels.

5. The mucous membrane consists of transitional epithelium, with a few mucous follicles and racemose glands in it.

The blood-vessels enter the bladder from the base, with the exception of the superior vesical arteries, which run through the upper parts of the posterior false lignments of the bladder.

Nature of the Process.—The process described above has received various names from different writers upon the subject, such as "croupous" or "diphtheritic inflammation of the bladder," "exfoliation of the bladder," "exudative cystitis," "plastic cystitis," etc., none of these terms indicating the pro-

cess by which the tissue is thrown off. The terms *croupous* and *diphtheritic*, in fact, imply the formation of a distinct false membrane. I will not venture to deny that such does occur, for it is well known that it does, but there is, in addition, a process called "necrosis of the bladder." This name has been suggusted by Dr. F. W. Haultain of Edinburgh, who, in a valuable monograph upon the subject, has proved the process to be one of distinct necrosis, the tissue being killed and thrown off just as in the case of a necrosed bone.

Now the question is, *is* this a false membrane or is it an integral part of the wall of the bladder that has become necrosed? I agree with Dr. Haultain and maintain that it is a necrotic process that has occurred in the vesical wall. The structure of the specimens in these cases differs from that of a false membrane. In the latter, you have leucocytes held together by bands of fibrin or connective tissue fibres, if the exudation has become sufficiently well organized; and it may contain more or less degenerated cells from the subjacent tissue. In the specimens from necrosis of the bladder, you find broken down granular cells held together by bands of fully formed white fibrous and yellow elastic tissue. The presence of muscular tissue in different stages of degeneration I hold to be further proof of the process being a necrosis of previously formed tissue, and not of the formation of new tissue.

The exfoliated membrane seems to be replaced by inflammatory tissue which has become fibrous. In fatal cases, the bladder has been seen to be surrounded by an area of inflammation, all the adjacent structures being matted together, forming a kind of secondary sac. The specimen from one of Dr. Haultain's cases shows this very well, there being two whitish patches on it somewhat resembling peritoneum. On closer examination, these patches proved to be pieces of this new fibrous tissue, which had adhered to the exfoliated sac and been torn off with it. A portion of the sac had separated and fallen across the urethral opening, so preventing the escape of urine. This collected behind the sac, forcing it further and further down through the urethra, as well as preventing its rise with the bladder wall

as this viscus became more and more distended, so tearing off patches of the newly-formed secondary sac.

Cause.—Of all the causes of necrosis of tissue, only two require to be considered here, viz. (1) mechanical injury and (2) interference with the circulation; and both may be taken together.

Let us look for a moment at the position of the female bladder. In the non-pregnant condition, the bladder is a pelvic organ entirely, as in the male. Even during pregnancy it is pelvic up to the end of the first stage of labour, when it becomes pelvo-abdominal, the neck and base lying behind the symphysis pubis, while the rest rises into the abdomen, but, on completion of the second stage of labour, it becomes pelvic again. These conditions are very clearly shown in the plates accompanying Dr. Barbour's very instructive paper on the anatomy of labour in the *British Medical Journal* for November 1st, 1890. We are now in a position to study how the bladder may be mechanically injured and have its blood supply cut off during labour.

As I have before stated, by far the greatest part of the blood supply of the bladder enters through its base. This, as has been seen, lies behind the pubic bones during the second stage of labour. The descending head presses the soft vesical wall between the cranial bones of the fœtus and the hard pelvic bones of the mother, but, normally, the duration of the pressure is too short to do much injury. If, instead of for two or three hours, this pressure is applied for a day or more, it can be readily understood what damage the continuous crushing does to the soft parts. Besides the direct mechanical injury inflicted by the pressure on the bladder walls themselves, the channels through which they receive their blood supply are pressed on so that it is interfered with to a greater or less extent. Retention of urine may also be brought about by this pressure of the neck of the bladder between the fœtal head and pubic bone (and it usually accompanies this condition), and increases the difficulty of the circulation through the bladder walls by the tension set up by the collecting urine.

If we look over the table which Dr. Haultain collected (and

which I annex to this paper), I think you will agree with me that interference with the circulation by pressure of the head and retained urine, and the mechanical injuries inflicted on the tissues themselves by this pressure, form the chief cause of this condition of necrosis. He collected fifty-three cases of necrosis of the bladder in females and three in males. Out of the former, no less than 42 or 79.2 per cent. had suffered from retention of urine, of which number 31 had retroposition of the gravid uterus. All but three were connected with pregnancy, occurring either before or after labour, and where the time is stated, it may be seen that pressure was exerted for from twelve hours to thirty-five days. In one case the retention was accompanied by extra-uterine gestation, while in that recorded by Tulpius no cause at all for the necrosis is given. Orlowski reports a case of vesical necrosis, which followed dysentery, in a girl three years old; and Lemaire reports a case of the same in a patient who had also been suffering from dysentery, these two cases showing that mere lowering of the system will be an active predisposing, if not immediate, cause.

Now as to the cause of the necrosis in the case that was under my own observation. There is no doubt but that the pressure of the child's head for so long a time set up an unhealthy action in the vesical walls, as I have endeavoured to show can be caused by pressure. The patient having such frequent calls to micturate shows that there must have been irritation of the bladder by the head or else over-distension; and the passing of the two pieces of membrane looks as if the pressure was upon the anterior and posterior walls, a piece coming from each. This pressure must have caused paralysis of the sphincter vesicæ, as well as further injuring the bladder, as there was marked incontinence of urine "for some time after labour," it only improving "as the patient grew stronger." From the history of the case, it is uncertain whether there was retention or not, as the frequent micturitions might very easily be the overflows of an over-distended bladder that are known to occur in cases of retention, the patient merely having been under the care of a midwife for the greater part of the time.

My own theory of the necrosis in this case is, that the vessels supplying the necrosed areas were so injured that exudation of corpuscles into the surrounding tissues occurred from the congested vessels, and by their pressure cut off the blood supply to these parts, so causing their death. The patches of dead membrane remained attached to the bladder wall by fibres of living tissue, into which one or two very fine blood vessels probably ran, so keeping the tissue from entirely disintegrating. The slight dilatation that the viscus must have undergone each time that it was washed out set up an acuter inflammation and so caused their separation and expulsion. Their presence in the bladder was quite sufficient to account for the symptoms of cystitis that had existed ever since the birth of the child, a steady improvement, ending in complete recovery, setting in as soon as the irritation set up by them was removed.

Some may ask if the necrosis was not set up by irritation of the catheter? I certainly do not think so, although this may have aided in causing the eventual separation of the tissues. Before the catheter was used at all the patient had all the signs and symptoms of a decidedly abnormal condition of the bladder walls, all being traceable to labour.

Diagnosis.—There is absolutely no means of diagnosing this condition from that of ordinary cystitis until the membrane can be seen to be separated, either by its spontaneous appearance at the meatus urinarius externus or by using the urethral speculum. If, however, the patient has all the symptoms of cystitis, following one of the above-mentioned causes, you may suspect necrosis to have occurred.

Prognosis.—This, of course, varies with the general condition of the patient and the extent and depth of the necrosed tissue. In one of the two cases that came under Dr. Haultain's care, the patient recovered, but had complete incontinence. In this case the whole lining of the bladder, including patches of peritoneum, came away. In his other case of complete necrosis, the patient died a few hours after her admission to the hospital. Even after the secondary sac has formed, death may occur from its rupture, as in the case reported by Krukenberg. On the

whole, however, prognosis, as regards life, is good, and unless the whole lining of the bladder has come away, control of the sphincter is regained sooner or later.

Treatment.—There is no special form of treatment for this condition, that indicated for ordinary cystitis being also indicated here, except that you should not wash out the bladder for several days after the passing of the membrane for fear of causing perforation or rupture of the viscus, and you must keep up the patient's strength with stimulants.

TABLE OF RECORDED CASES OF EXFOLIATION OF THE VESICAL MUCOUS MEMBRANE IN THE FEMALE.

A.—*After Labour.*

		Description of Sac.	Result.	Reference.
1	Wells *	Entire coats of bladder and at parts peritoneum	Recovery	*Path. Trans.*, Lond., 1863, vol. xv., p. 140.
2	Wells	Mucosa, submucosa, and degenerated muscle	Death	*Path. Trans.*, Lond., 1863, vol. xv., p. 140.
3	Martyn	Mucosa, submucosa, and some muscle	Recovery	*Path. Trans.*, Lond., 1863, vol. xv., p. 137.
4	Barnes	?	Recovery	*Med. Times*, 1861, vol. i., p. 186.
5	Bell	Mucosa	Recovery	*Edinburgh Med. Journal* 1875.
6	Hewitt	?	Recovery	*Obstet. Trans.*, Lond., 1863.
7	Aveling	Mucosa	Recovery	*Obstet. Trans.*, Lond., 1883.
8	Boldt *	Mucosa, submucosa, and muscle	Death	*American Journal of Obstet.*, 1888.
9	Mauer *	Mucosa, submucosa, and muscle	Recovery	Thesis, Berlin, 1881.
10	Doran	Mucosa, submucosa, and muscle	Recovery	*Obstet. Trans.*, Lond., 1881.
11	Krukenberg	Mucosa, entire muscularis, and a large portion of peritoneum	Death	*Archiv fur Gynœcologie*, vol. xix., 1882.
12	Specimen in Univer. Coll.	Mucosa, submucosa, and muscularis	Recovery	Specimen, 1466.
13	Phillip	?	Recovery	*British Medical Journal*, 1871.
14	Lockhart	Mucosa, submucosa, and muscularis	Recovery	*Montreal Med. Journal*, July, 1891.

B.—*Due to Gravid Retroposition of Uterus.*

15	Godson	?	Recovery	*British Medical Journal*. 1871, vol. ii., p. 432.
16	Wardell	?	Recovery	*British Medical Journal*, 1871.
17	Schatz	Mucosa, submucosa, and entire muscular wall	Death	*Archiv fur Gynœcologie*, vol. i., p. 469.
18	Moldenhauer	Mucosa, submucosa, and some muscle	Death	*Archiv fur Gynœcologie*, vol. vi., p. 108.
19	Frankenhauser	The greater part of the entire bladder wall with peritoneum	Recovery	*Archiv fur Gynœcologie*, vol. vi., p. 77.
20	Luschka	Mucosa and submucosa	Death	*Virchow's Archiv*, 1854, p. 30.
21	Brandeis	Mucosa	Recovery	*Archiv fur Gynœcologie*, vol. vii.
22	Mannder	Almost entire bladder	Recovery	*Med. Times and Gazette*, vol. ii., 1863, p. 522.
23	Zeitfuchs	?	Recovery	Siebold's *Journal fur Geburtshulfe*, 1833.
24	Wittich	Mucosa with portion of muscle	Recovery	Siebold's *Journal fur Geburts.*, 1833.
25	Hausmann	Mucosa	Recovery	*Monatsch. fur Geburts.*, 1868, vol. xxxi, p. 132.
26	Madurowicz	Entire thickness of bladder with portion of peritoneum	Recovery	*Wiener Med. Wochensch.*, 1877, Nos. 2 and 3.
27	Hurry	Mucosa and submucosa	Recovery	*Edin. Med. Jour.*, 1884, p. 1000.
28	Pinard & Varnier	Mucosa, submucosa, and muscle	Death	*Annales de Gynecol. et d'Obstetriques*, 1886.
29	Walters	?	Recovery	*Obstet. Transactions.*
30	Baynham	Mucosa	Recovery	*Edin. Med. and Surg. Journal*, 1830, vol. xxxiii, p. 156.
31	Hitter	Mucosa and submucosa	Recovery	*Vierteljahrschrift fur heilkunde*, Prague, 1844, p. 37.
32	Klein	Mucosa, submucosa, and muscle	Death	Inaugural Dissertation, Berlin, 1880.
33	Rosenplanter	Mucosa and submucosa	Recovery	Inaugural Dissertation, Dorpat, 1856.
34	Haultain	Mucosa and submucosa, and entire muscle with portion of peritoneum	Recovery	

C.—*Due to Impaction of Fœtal Head in Pelvic Brim before Labour.*

35	Whitehead	Mucosa, submucosa, and muscle	Recovery	*British Medical Journal*, 1871, vol. ii., p. 432.

Those marked * had no retention of urine.