

RUPTURE OF THE BLADDER.*

WITH REPORT OF THREE UNUSUAL CASES.

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RUPTURE of the bladder is not a common lesion, for that reason most cases have been and should be reported. Several excellent papers, including the statistics of reported cases, have been contributed, during the past ten years, by Alexander,¹ Jones² and others.

Most cases are either intra- or extraperitoneal. The latter is commonly associated with fracture of the pelvis, the former is the more common variety. Rarely there may be a combination of both.

Etiologically the lesion is usually due to an injury to a full bladder. A number of cases are recorded where it has occurred during distention for a suprapubic cystotomy, the rectum being at the same time distended by a Peterson bag. This distention is quite unnecessary if the patient is in the Trendelenburg position.

In a very few cases the bladder was not full at the time, but had just been emptied. In such cases great violence is required, and the rupture is extraperitoneal. Routh³ reported the case of a drunken man, thirty-four years old, whose bladder was ruptured extraperitoneally by a kick in the abdomen one hour after voiding.

Again there may be no external injury. Such cases are called idiopathic ruptures, and usually depend upon some pathologic condition of the bladder associated with the presence of stone, stricture of the urethra or hypertrophy of the prostate. In a bladder thus weakened, and distended,

* Read before the American Surgical Association, May 8, 1913.

¹ ANNALS OF SURGERY, xxxv, 1902, p. 106.

² ANNALS OF SURGERY, xxxvii, 1903, p. 215.

³ Brit. Med. Journ., Sept. 21, 1901, p. 811.

violent muscular effort, especially violent attempts to empty the bladder, may cause its rupture.

Apart from such predisposing conditions idiopathic rupture is rare.

The first case that I report was apparently an idiopathic rupture, without such predisposing conditions.

The patient, a single man, thirty-one years old, was alcoholic and on the previous evening, while bowling, was said to have drunk over a quart of champagne, besides beer. He said that he urinated at midnight and that at about 4 A.M. he was seized with a violent paroxysmal pain in the abdomen, which proved to be due to an intraperitoneal rupture of the bladder, low down on the posterior surface. When I saw him the next day the abdomen was much distended, rigid and tender. He had been twice catheterized and very bloody urine withdrawn. There were no history or signs of trauma, and he consistently denied having had any. The possibility of some trauma, which passed unnoticed on account of the effects of the alcohol, should be considered. But when he returned home, shortly after midnight, he had just voided, so that the supposition that he ran against the newel post, or some such thing, is not a likely explanation, as the bladder was not then distended. Moreover the pain did not come on until 4 A.M. The rupture probably occurred then for it is usually though not invariably followed at once by pain, and often by shock, in intraperitoneal ruptures. A few cases, however, are reported where the symptoms have been delayed for many hours or even days, and in patients under the influence of alcohol the shock may be lacking. Under the conditions present in this case we cannot arbitrarily assume that there was a trauma, but must admit that it was possibly an idiopathic rupture, due to rapid distention, on account of alcoholic excess.

As rupture may occur from violent muscular action of the bladder and the abdominal walls, we may admit the possibility of such a contributing cause, for the bladder wall felt and appeared healthy and distention alone in so short a time is not likely to have caused the rupture.

Frieberg⁴ reports an intraperitoneal bladder rupture in a drunken man, from overdistention, without any known outward injury. Sugetinow⁵ reports a case of intraperitoneal rupture of the bladder due to heavy lifting. The patient felt a sudden pain, and again on the fifth day, dying on the eighth day. Sugetinow believed that the mucous and muscular coats only gave way at first and the peritoneum on the fifth day. Jones⁶ also reports the case of a man who, soon after urinating and defecating, had severe pain across the lower abdomen, with nausea and a desire to urinate. There was no trauma and an intraperitoneal rupture was found and closed. He was alcoholic. Bolton⁷ reported a small rupture of the bladder in a man after two days intoxication. There was no history of injury and he woke up with pain in the abdomen. This patient was examined with the finger in the bladder, and no evidence of ulceration or any pathologic condition was found to account for rupture from overdistention.

It is well known that alcoholism predisposes to rupture of the bladder by causing its rapid distention and obtunding its sensitiveness, so that the call to urinate is disregarded. The muscles of the abdominal wall, which guard the bladder from injury, are also relaxed, so that a slight blow on the abdomen is sufficient to rupture the full bladder without leaving any sign of injury and without the patient being conscious of it. In any drunken patient the occurrence of some trauma can never be excluded.

In Case II the lack of any trauma is more definitely established. This patient was also alcoholic but not a drunkard. The case was obscure from the first, trauma was denied and there was no previous trouble with the bladder or urethra. While in perfect health, 6 days before he was seen by me, a man forty-two years old was taken with nausea and vomiting,

⁴ Virchow. Archiv., Bd. ccii, p. 268.

⁵ Zblatt. f. Frankf. d. Hum. u. Sex Organ., 1900, p. 582.

⁶ Loc. cit.

⁷ ANNALS OF SURGERY, xxxvii, 1903, p. 438.

and the next morning with pain and tenderness in the right lower quadrant. Urination was normal. As he had had two previous attacks of pain in the right lower quadrant, with vomiting, etc., the diagnosis of appendicitis was made. When seen by me he was very septic and weak, in wretched condition, stuporous, and hiccupping continuously. The abdomen was distended and held quiet, and there was a large tender mass in the right lower quadrant. At the operation a very large quantity of ammoniacal purulent urine was found retroperitoneally, extending up behind the kidney and down into the pelvis. The appendix was normal. Subsequently the X-ray revealed no stone and tuberculin tests were negative, so that the usual causes of ulceration and perforation of the kidney pelvis and ureter were absent. Moreover, the urine remained alkaline and, for a time, the greater part of the total urine came from the incision, leaving only 5 to 8 ounces to be voided.

This pointed to a lesion of the bladder and on cystoscopy there was seen behind the right ureter mouth, a crevice extending laterally nearly across the bladder floor. It resembled a "healing scar, as if a rupture might have occurred here." In about three weeks the discharge of urine from the wound ceased, and a later cystoscopy showed the crevice left by the rupture, much shorter.

He made a slow convalescence and is now, two and a half years later, better than he has been for years.

These two cases are of interest in their bearing on the principle, emphasized by Naumann⁸ and others, that a normal bladder never ruptures spontaneously, but that such a rupture depends upon pathologic changes in the bladder wall. In Case II we can not exclude the possibility of a pathologic bladder, in Case I, of some trauma. In the case of a man of fifty-five years, reported by Hosemann,⁹ who was seized in the night with severe abdominal pain, operation revealed a small intraperitoneal rupture of the bladder. Trauma, drunkenness and overdistention were excluded, hence he assumes

⁸ Zblatt. f. Chir., 1911, p. 1344.

⁹ Zblatt. f. Chir., 1912, p. 1323.

an abnormal or pathologic bladder, although such cases of rupture are rare. The operation and subsequent cystoscopy revealed nothing abnormal in the bladder.

Rupture of the mucous and muscular layers, giving rise to a diverticulum covered by peritoneum, has been reported by Reid. In case of a previously formed diverticulum rupture of the weakened wall would require less force than is usually necessary to rupture the bladder.

In Case II the idea first to suggest itself is that there was a perforation of an ulcer, tuberculous or malignant, from within, so that it was a case of perforation rather than rupture. The cystoscope, however, failed to reveal any evidence of a diverticulum or of an ulceration, and there were no previous symptoms to suggest them. Alexander¹⁰ has reported the case of a non-tuberculous abscess, following the psoas tendon, which ruptured into the bladder on the left side, and he had seen two cases of appendix abscess which opened into the bladder. According to Alexander the prognosis, in such cases, is good, except in tuberculous abscesses, and is much better when the rupture occurs from without in than in the opposite direction. In this case there was no symptom or sign of the rupture of an abscess into the bladder, no voiding of pus and no disturbance of micturition.

Speaking of spontaneous rupture from overdistention Gross says: "The mucous and muscular coats generally give way posteriorly, where the urine accumulates under the peritoneum as a kind of secondary pouch." And again the "urine may extend as high as the umbilicus and kidneys." Though we have in this case no good evidence of rupture from overdistention, the above description indicates the course the urine took.

The chief interest in Case III also concerns the etiology. There was here a history of trauma.

A man, thirty-six years old, while asleep on a fire escape, fell one story, landing on the buttocks and woke up with supra-

¹⁰ *Loc. cit.*

pubic pain and a desire to urinate. On operation an extraperitoneal rupture was found a little to the left of the middle line. There was no fracture of the pelvis.

Deaver,¹¹ has reported a case, also walking in his sleep, who fell two stories, landing on the buttocks, and had an extraperitoneal rupture of the bladder, without fracture of the pelvis.

Ashhurst¹² states that the rupture is sometimes caused by counterstroke, as by a fall on the buttocks. My patient drank two glasses of beer before going to sleep, and the bladder was full at the time of the fall. Whether the bladder is burst by the hydraulic pressure from within, which, when the fall is suddenly stopped, expands the bladder in planes at right angles to the vertical axis at the time of the fall, or whether a sudden muscular spasm is produced by the fall, is an open question. There was no direct blow on the bladder in this case, but the mechanism is much the same as in most of those where there is a direct blow over the bladder, without pelvic fracture, *i.e.*, an expanding of the bladder in one plane and a contraction or flattening in the plane at right angles to this.

Another interesting feature in this case was that though the principal rupture was apparently altogether extraperitoneal, there was considerable bloody fluid with a urinous odor in the peritoneal cavity. Also after an injection into the bladder, by the house surgeon, of 6 ounces of saline solution, of which only 3 ounces returned, the dulness, previously noted in the left flank and the left lower quadrant, was noticed to be shifting. On careful examination of the pelvis, in the Trendelenburg position, no intraperitoneal rupture of the bladder and no tear of the peritoneum could be found, though some fluid could be seen beneath the peritoneum. There was, however, what looked like a contusion, with ecchymosis beneath it, on the posterior surface of the bladder. On account of the fluid in the peritoneal cavity a drain was left in the rectovesical pouch, as well as in the prevesical space. The patient made a good recovery.

Kerr¹³ reports a case of intraperitoneal rupture in which he was unable to find the rupture, though boric acid solution, injected into the

¹¹ ANNALS OF SURGERY, xxix, 1896, p. 751.

¹² ANNALS OF SURGERY, xxxiii, 1898, p. 385.

¹³ ANNALS OF SURGERY, xxiii, 1893, p. 647.

bladder, was felt to well up in the bottom of the pelvis. Hence similar drainage was employed with a successful result.

Thorndike¹⁴ reported six cases of rupture of the bladder, in two of which the opening could not be found. The wounds were drained and both patients recovered. In extraperitoneal ruptures failure to find the rupture is more common, and I know of such a condition in an unrecorded case.

In only one of the three cases was injection of a measured quantity of fluid used to confirm the diagnosis. When followed by operation without delay there is little danger. The fluid is sterile and so is the catheter. The danger lies in the carrying in of infection from the urethra in some cases. Hence the danger is about equally great in simple catheterization. In most cases the injection is unnecessary and in a few cases it has proved unreliable. Thus Bolton¹⁵ reports a case where the small intraperitoneal opening was closed by fibrin, and all the fluid injected was returned by the catheter. Also Turnure¹⁶ reports the case of a 3-inch intraperitoneal rupture in a drunken man, without history of trauma; where the fluid injected was all returned by catheter.

It has been demonstrated that sterile urine does not cause peritonitis. If the urine does not have a free outlet it is liable to become decomposed in time, giving rise to irritation. In several recorded cases the occurrence of peritonitis, or peritoneal irritation, has been delayed a number of days. This indicates that the bladder and its contents are sterile.

In most cases silk has been used to suture the bladder. When silk is used it is important to avoid passing it through the mucosa. This precaution is unnecessary when plain catgut is used. Chromic catgut is strong and durable enough for the muscularis. An additional peritoneal suture of silk or catgut should be added. The Trendelenburg position is of the greatest service in suturing ruptures on the posterior surface.

The bladder may be drained by a permanent catheter, or

¹⁴ Journ. of Cutaneous and Genito-Urinary Diseases, May, 1899.

¹⁵ *Loc. cit.*

¹⁶ ANNALS OF SURGERY, vol. lvi, 1912, p. 807.

the patient may be catheterized frequently or made to void at short intervals. I prefer the permanent catheter for the first few days, unless it is contra-indicated by some infection of the urethra or bladder.

Two out of the three cases recovered. The only case of purely intraperitoneal rupture, a very alcoholic patient, died of delirium tremens and pneumonia on the fourth day after operation.

In 1907 Quick,¹⁷ adding to previous statistics, found a mortality of 41.02 per cent. in 117 cases of intraperitoneal rupture of the bladder operated upon, or, since 1892, a mortality of 24.1 per cent. in 29 cases.

¹⁷ ANNALS OF SURGERY, xlx, 1907, p. 94.