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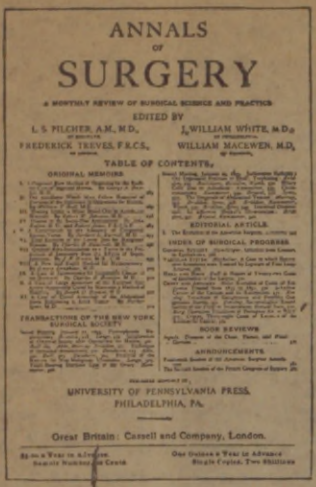
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SURGERY
A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE
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A CASE OF INTRA-PERITONEAL RUPTURE OF THE BLADDER; RECOVERY AFTER LAPAROTOMY.

By JAMES KERR, M.D.,

OF WASHINGTON, D. C.

SURGEON TO EMERGENCY AND PROVIDENCE HOSPITALS, PROFESSOR OF SURGERY, GEORGETOWN UNIVERSITY.

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By JAMES KERR, M.D.,

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THE patient, W. H. B., a white male, thirty-three years old, May 13, 1892, fell thirty-five feet down the outside of an elevator shaft, striking the ground "all doubled up," with most of his weight on his left hip.

He was brought to the Emergency Hospital about one-half hour later, in a state of shock and complaining of great pain over the region of the hip and hypogastrium. Was very sore on any movement. Sent to the ward and kept under observation.

Eight hours later the shock and pain continued, the latter most marked over hypogastrium, where there was some ecchymosis and swelling. There was also marked abdominal tenderness, and the pulse small and thready. Catheterizing him, a small quantity, half-ounce, of bloody urine was withdrawn.

Rupture of the bladder was diagnosed and an operation determined on.

Incision was first made into the prevesical space. The cellular tissue was found extensively infiltrated. On cutting down to the bladder it was collapsed, but no extra-peritoneal injury could then be detected. Fracture involving the symphisis and descending ramus of the pubis on the left side was made out. On injecting a solution of boracic acid per urethram it was felt to well up at the bottom of the incision. As only a small part of the fluid returned in this way, and the balance not distending the bladder, it was supposed to be escaping into the pelvic cavity.

It was, therefore, deemed advisable to open the general peritoneal cavity, and the original incision was prolonged upward. The intestines distended, and, showing signs of peritonitis, crowded into the wound. Arrangements being made for the Trendelenburg position, after the elevation of the pelvis the intestines gave little further trouble.

On injecting more of the boracic lotion it could be felt to well up in the bottom of the pelvis, with a distinctly urinous odor, proving that the rupture was intra-peritoneal and beyond the reflexion of the pelvic fascia.

The bladder was carefully examined to locate the injury, but without success. It was then opened and a Trendelenburg tube introduced. An effort was then made to close in the ruptured area by suturing the side of the bladder as low down as it could be reached to the pelvis in front. The general peritoneal cavity was then irrigated with a 1–10,000 bichloride solution and a drainage tube introduced in front of the bladder. The operation was completed by placing a tampon of iodoform gauze in the abdomen behind the bladder.

The shock following the operation was severe, but the patient made a good recovery. Temperature and pulse became normal on the fifth day. He left the hospital one month from admission, and when seen four months afterward was in perfect health.

The after-treatment consisted of free saline catharsis and boracic fomentations to absorb the urine from the anterior wound. These were changed at first every hour, the interval being increased as the wound in the bladder healed. The bladder was at first washed out through the drainage tube twice a day with a solution of boric acid. The iodoform tampon was changed at the end of the second, and permanently removed at end of the fourth day. The drain from the prevesical space two days following, and the bladder drain two weeks later. I attribute success in this case to a comparatively early operation and the open method of dealing with the infected peritoneum.

I append a list of all the cases that could be tabulated up to date from a search made at the Library of the Surgeon-General's office here:

TABLE OF CASES OF LAPAROTOMY FOR INTRA-PERITONEAL RUPTURE OF URINARY BLADDER.

OPERATOR.	DATE.	INJURY AND SYMPTOMS.	OPERATION.	RESULT.	REFERENCE.
Blum, A.	May 15, 1887.	M., aged twenty-eight, run over by a wagon; pain in thigh; could not urinate; May 16, abdomen distended; painful; catheter inserted and urine drawn which was free of blood; vomiting; peritonitis.	Forty hours after injury incision in linea alba; on opening peritoneum a large quantity of yellow fluid escaped; rupture on upper portion of bladder the size of a franc; rent closed by six Lembert sutures; vomiting ceased; peritonitis allayed.	Entirely recovered June 20.	Arch. Gén. de Medecine, Paris, 1888, T. XXII, p. 22.
Brown, J. Y.	April, 1887.	A. W., fell on corner of doorstep; when seen, patient in a state of collapse; vomiting; severe pain; passed bloody urine.	Laparotomy twenty-two hours after injury; blood-stained fluid found in peritoneal cavity; rent on posterior surface of bladder 1½ inches long: closed with Lembert sutures including peritoneal and muscular coats of viscus; no leakage when filled with Thiersch's solution; catheter tied in bladder.	Died sixteen hours after operation.	Medical Record, New York, 1888, XXXIII, p. 632.
Bull, W. T.	October 27, 1884.	—, aged forty-six; fall into cellar; great shock; bloody urine; dullness half way to umbilicus; catheter went beyond bladder; also fracture of pelvis.	Laparotomy thirteen hours after injury; rent in posterior wall of bladder 3¾ inches long: seven Lembert sutures; catheter tied in.	Died in seven hours.	ANNALS OF SURGERY, 1885, I, 67.
Duncan, J.	May 5, 1886.	W. E., aged thirty-eight; run over by cart; shock; desire to urinate, but no power; bloody urine; peritonitis; vomiting.	Perineal cystotomy failed to discover rent; abdominal section twenty-two hours after injury; blood and urine in cavity; rent in posterior vesical wall 2½ inches; bladder wound was not sutured; glass drain introduced into bladder.	Died in fifty-five hours.	Lancet, 1886, II, 399.
Fox, J. M.	August 16, 1866.	E. M., aged forty-five; fell from a window; pain; unable to urinate; three ounces of bloody urine drawn by catheter; anxious expression; also fracture through neck of right femur.	Twenty hours after injury incision just above pubes; bloody urine and blood clots in cavity; superior surface of bladder torn from side to side; fifteen Lembert sutures; catheter passed through urethra and left in bladder; peritonitis.	Died August 18; forty-two hours after operation.	Medical News, Philadelphia, 1887, LI. p. 673.

CASES OF LAPAROTOMY FOR INTRA-PERITONEAL RUPTURE OF URINARY BLADDER.—Continued.

OPERATOR.	DATE.	INJURY AND SYMPTOMS.	OPERATION.	RESULT.	REFERENCE.
Heath, C.	November 25, 1878.	J. B., aged forty-seven; hit in the stomach; belly tense; bloody urine by catheter; water injected felt in abdomen by patient.	Laparotomy forty hours after injury; extensive rupture of bladder; continuous suture.	Died in six days; autopsy; suture had given way.	Medico-chirurgical Transactions, Vol. LXII, 337.
Herrick, J. B.	May 31, 1889.	J. D., aged twenty-eight; kicked by a horse in supra-pubic region; severe pain; bloody urine drawn by catheter; tympanitic; injection of boric acid solution confirmed rupture.	Twenty-three hours after injury incision from 1 inch above umbilicus to symphysis pubis; on puncture reddish fluid escaped; rent in bladder on posterior wall near fundus; Lembert sutures; cavity irrigated with boric acid solution; glass drain.	Died forty-nine hours after accident.	North American Practitioner, Chicago, 1889, I, 408.
Hitchcock, H. O.	1888.	Rupture of bladder.	Laparotomy; rent six inches in length; sutures.	Died.	Pittsburgh Medical Review, 1888, II, 55.
Hofmokl.	March, 29, 1886.	K. L., aged twenty-seven; fell from a window; symptoms principally those of extra-peritoneal rupture; also fracture of right forearm.	Laparotomy ten hours after injury; intra- and extra-peritoneal rupture of bladder; great infiltration of tissues with blood; partial suture of bladder; upper portion left open and drained.	Recovery.	Wiener Medizinische Presse, 1886, p. 1228.
Holmes.	June 9, 1887.	H. P., aged twenty-four; kicked in the abdomen; great pain; unable to void urine; blood-stained urine drawn per catheter.	Incision in median line six hours after injury; peritoneal cavity opened; rent in bladder about two inches long; closed by eight sutures; cavity washed out; during next night voided urine naturally.	Recovery.	Lancet, London, July, 1887.
Hulke.	January 14, 1892.	C. E., aged thirty-three; butted in abdomen; great pain; anxious expression; urgent desire to micturate; urine mixed with blood, drawn repeatedly; vomiting.	January 17, laparotomy; several ounces of grumous, bloody fluid escaped on opening peritoneum; rent in posterior wall of bladder 2½ inches long; closed with double row of sutures; peritoneal cavity flushed; vomiting returned; peritonitis.	Died January 18.	Lancet, London, 1892, II, p. 197.
Keyes, E.	December 1, 1887.	P K., aged twenty-two; run over by cart; scalp wound and lacerated wound of scrotum; abdomen tympanitic; vomiting; collapse imminent.	Laparotomy twenty-two hours after injury; bloody fluid gushed out; rent in bladder 1½ inches long in front of peritoneal reflection; nine Lembert sutures; bladder distended with Thiersch's solution found water-tight; no catheter inserted.	Died eighteen hours after operation.	Medical Record, New York, 1887, XXXII, 781.

CASES OF LAPAROTOMY FOR INTRA-PERITONEAL RUPTURE OF URINARY BLADDER.—Continued.

OPERATOR.	DATE.	INJURY AND SYMPTOMS.	OPERATION.	RESULT.	REFERENCE.
Knight.	October 15, 1888.	G. H., aged forty-nine; fell against corner of a bench; great pain; vomiting; inability to urinate; catheter passed without result; abdomen tender and distended.	October 17, laparotomy; fluid welled up on opening peritoneum; ragged rent in fundus of bladder 1½ inches long, closed with continuous sutures; peritoneal cavity washed; peritoneum brought together with catgut, and abdominal wall with wire suture; soft catheter tied in bladder.	Recovery; discharged well, November 25.	New Zealand Medical Journal, Dunedin, 1889-90, III, 158.
MacCormac, W.	September 22, 1885.	W. S., aged thirty-three; fell against iron post; no shock; ninety-five ounces of blood-stained urine withdrawn by catheter; great pain; vesical tenesmus. Had walked one mile to hospital day after injury.	Laparotomy nineteen hours after injury; vertical rent in posterior wall of bladder 4 inches long; sixteen Lembert sutures; peritoneum divided at sides to relax bladder walls; abdominal drainage tubes.	Rapid recovery.	Lancet, London, 1886, II, 1118.
MacCormac, W.	November 17, 1886.	C. F., aged thirty-seven; fall from scaffold; no symptoms of intra-peritoneal injury; no shock; next day fluid present in abdomen; vesical tenesmus; signs of incipient peritonitis; nausea.	Laparotomy twenty-seven hours after injury; large amount of bloody fluid in abdomen; rent 3 inches long in upper part of posterior bladder wall; twelve Lembert sutures; urine passed voluntarily; no abdominal drainage.	Recovered.	Lancet, London, 1886, II, 1118.
McGill, A. F.	October 20, 1886.	M. B., aged fifty-four; run against iron gate; insensible for some time; pain; bloody urine; could not urinate; peritonitis.	Laparotomy sixty-eight hours after injury; pint of urine in cavity; 4 inch rent in apex and fundus of bladder; nine chromic sutures; autopsy: bladder wound firm; no fluid in cavity.	Died in seventeen hours	Lancet, London, 1886, XXI, 972.
Robson, A. W. M.	. . . . .	—, aged sixty-eight; desire but inability to micturate; bloody urine drawn by catheter; fracture of right side of pelvis.	Membranous urethra opened and tube introduced into the bladder; laparotomy three hours after injury, in median line, but as no urine or rupture into peritoneal cavity was found, the external wound was closed.	Died in a few hours from shock. At autopsy it was found that a fragment of the pelvis had penetrated anterior wall of bladder.	MacCormac on Abdominal Section, London, 1887, p. 53
Scion.	1887.	—, aged twenty; retention of urine; bloody fluid drawn off; hiccough; pain above pubes.	Laparotomy; rent in front of bladder admitted tip of index finger (extra-peritoneal); woundstitched to abdominal wall; drainage tube nine days.	Recovered. It is doubtful whether peritoneal cavity was opened or not.	ANNALS OF SURGERY, February, 1887.

Cases of Laparotomy for Intra-peritoneal Rupture of Urinary Bladder.—Continued.

Operator.	Date.	Injury and Symptoms.	Operation.	Result.	Reference.
Sonnenburg.	1885.	No peritonitis for twenty-four hours; 1000 grams clear urine drawn off.	Laparotomy two days after injury; rent from vertex to neck along posterior wall of bladder; no sutures; drainage tube; infiltration of urine and intense peritonitis.	Died on fourth day.	Centralblatt für Chirurgie, 1885, p. 838.
Symonds, C. J.	1888.	Girl, aged seven; fell from a bridge into a passing barge: extreme collapse; catheter inserted six hours after accident, and dark blood drawn off.	Laparotomy seven hours after injury; dark fluid, with urinous odor escaped; rent 1¼ inches in bladder closed with twelve Lembert sutures; catheter tied into bladder, which irritated patient.	Died on eighth day.	Lancet, London, 1888, 1, 977.
Teale, T. P.	December, 6, 1883.	F. S., aged twenty-five; kicked in abdomen: unable to urinate: abdomen distended and tender; only one ounce fluid drawn by catheter; no shock.	Laparotomy two hours after injury; rent in posterior surface of bladder near apex, closed by six sutures; unusual oozing of blood from abdominal wound.	Died in about twenty hours.	Lancet, London, 1887, 1, 1133.
Rose, P. Edward.	1892.	Boy, seven years old; admitted to hospital two days after accident: abdomen distended and tender; dullness in lumbar regions and echymosed; vomiting; constipation; passing only few drops of bloody urine.	Laparotomy; bladder contracted and stellate rent on upper surface; *not* sutured; drains on either side and packed with iodoform gauze and catheter left in bladder.	Recovered.	Deutsche Zeitschrift für Chirurgie, Bd. XXXI, Heft 3 and 4.
Walsham, W. J.	March 1, 1887.	C. H., aged twenty-two; butted in abdomen: great pain, but little shock; next day on passing catheter no urine flowed.	Laparotomy thirteen hours after injury; intra-peritoneal rent in posterior wall of bladder sewed up with nine Lembert sutures; bladder injected with boric acid solution found tight; peritoneum irrigated; abdomen closed as in ovariotomy.	Recovered.	Lancet, London, 1888, 1, 173.
Walter.	. . . . .	—, aged twenty-two years; hit in the abdomen; signs of active peritonitis.	Laparotomy ten hours after injury; much blood and urine; extensive tear at base of bladder 2 inches long; no sutures into bladder; drainage tube; catheter in bladder; opium treatment.	Recovered.	MacCormac on Abdominal Section, London, 1887, p. 54.
Willet, A.	June 11, 1876.	T. F., aged forty-eight; kicked over pubes; shock and pain; bloody urine by catheter; symptoms of peritonitis.	Laparotomy twenty-nine hours after injury; rent 3½ inches across fundus of bladder; interrupted sutures.	Died in twenty-three hours. At autopsy, portion of bladder wound found open.	St. Bartholomew Hospital Reports, 1876, p. 209.

CASES OF LAPAROTOMY FOR INTRA-PERITONEAL RUPTURE OF URINARY BLADDER.—Continued.

OPERATOR.	DATE.	INJURY AND SYMPTOMS.	OPERATION.	RESULT.	REFERENCE.
Schlange, H.	1892	Man, aged thirty-four; injured by heavy wagon; laparotomy twenty-four hours after; an intra- and extra-peritoneal rupture: intra sutured extra packed with iodoform gauze.	Urine mopped out of peritoneal cavity, not flushed.	Recovered.	Arch. für Klin. Chirurgie, Bd. XLIII, Heft 1.
Page.	February 6 1892.	Injured by man falling on him; next day patient anxious expression; thready pulse and distended abdomen.	Laparotomy found collapsed bladder with stellate wound on back and upper part of fundus sutured.	Died before completion of operation.	Lancet, London, February 6, 1892.
Kerr, J.	May 13, 1892.	Man, aged thirty-three; fell thirty-five feet; fracture of pelvis; on opening prevesical space injected fluid not returning through wound or filling bladder; laparotomy performed and combined intra- and extra-peritoneal rupture made out.	Operation eight hours after injury; side of bladder stiched to pubes and pelvis tamponed with iodoform gauze; bladder and Retzius space drained	Recovery.	ANNALS OF SURGERY, December, 1893
Pilcher, L. S.	July 26, 1893.	Man, aged twenty-three; fell from second story of a dwelling house while drunk; no apparent injury at time; gradual supervention of symptoms of internal hæmorrhage; six hours later found in profound collapse, with empty bladder and slight bloody discharge from urethra; rallied by stimulants and intravenous saline infusion of forty fluid ounces.	Laparotomy twelve hours after injury; abdomen filled with blood and urine; longitudinal rent 1½ inches long, at apex of bladder; bleeding from torn superior vesical veins: abdominal cavity sponged out and irrigated; bladder tear sutured: abdominal wound closed	Death two hours after close of operation from shock and anæmia.	Personal Communication.

Twenty-nine cases. 11 recoveries; 18 deaths.