An early 19th-century Canadian surgical practice: the casebook of John Mackieson of Charlottetown, 1795–1885

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A casebook written by Dr. John Mackieson (1795–1885), of Charlottetown, contains the records of 49 surgical cases he managed between 1826 and 1857. In view of the rarity of first-hand accounts of surgical practice in Canada in the mid-19th century, Mackieson's case records are a significant source of information. These cases are discussed in order to delineate Mackieson's approach to the surgical problems he faced in his general practice. His case records also illustrate some of the general problems that beset surgeons in that era.

Un recueil de cas rédigé par le Dr John Mackieson (1795–1885), de Charlottetown, contient les dossiers de 49 cas de chirurgie qu'il a pris en charge en 1826 et 1857. Compte tenu de la rareté des comptes rendus personnels sur la pratique de la chirurgie au Canada au milieu du XIXe siècle, les dossiers de cas du Dr Mackieson constituent une importante source d'information. On discute de ces cas afin de déterminer comment le Dr Mackieson a abordé les problèmes chirurgicaux auxquels il a fait face en médecine générale. Ses dossiers de cas illustrent aussi certains des problèmes que rencontraient couramment les chirurgiens de l'époque.

A casebook entitled *Sketches of Medical and Surgical Cases...* contains the detailed records of 257 clinical cases seen by Dr. John Mackieson, of Charlottetown, between 1826 and 1858.[1] Among these records are 49 surgical cases. Mackieson's records are significant as a primary source of information about surgery in that era, owing to the lack of first-hand accounts of surgical practice in Canada in the first half of the 19th century. The daybooks of James Langstaff, of Richmond Hill, Ont., covering the period from 1849 to 1882, are the only other primary source on Canadian material that has been studied.[2] In the United States the journals of William Lindsay, of Indiana and Ohio, provide descriptions of his surgical cases from 1835 to 1855.[3] Mackieson's casebook is of interest, too, in being based on a small practice in Prince Edward Island, for his first-hand clinical accounts give one surgeon's experience as opposed to contemporary surgical textbooks such as those of surgeons of the calibre of John Abernethy,[4] Astley Cooper[5] and Robert Liston[6] in Great Britain and Dominique-Jean Larrey[7] and Guillaume Dupuytren[8] in France.

Mackieson's casebook is 1 of 4 manuscripts based on different aspects of his practice; together with an account of his life and career, these have been described previously.[9,10] In this paper we review Mackieson's surgical records in order to highlight his approach to surgery and to illustrate some aspects of surgical practice in the mid-19th-century.

John Mackieson's career

A native of Scotland, John Mackieson studied medicine in Glasgow, and was graduated from that city's Faculty of Physicians and Surgeons on Nov. 7, 1815. After practising in the ancient city of Stirling he moved south to Liverpool. There he met one John MacGregor, who had lived in Prince Edward Island and who suggested to the young doctor that, like many other Scots in the late 18th and early 19th centuries, he migrate to Prince Edward Island. He arrived in Charlottetown on Nov.

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21, 1821, where he settled and practised there until he died on Aug. 27, 1885 at nearly 90 years of age.

Although nominally a general practitioner, who would not be expected to perform major surgical operations, Mackieson had a special interest and skills in surgery and obstetrics. His surgical ability soon became well known; thus a local newspaper, reporting on an operation for strangulated hernia that he performed on June 10, 1834, stated that this was the third such operation he had performed since his arrival on the island.[11] The surgical work available, however, was insufficient to support him purely as a surgeon, so other sources of remuneration became important. These included government-funded positions, including Port Health Officer (1833–1847), Medical Superintendent of the Charlottetown Lunatic Asylum (1847–1874) and Medical Attendant to the Queen's County Jail (1863–1881). Even so, as his diary shows, Mackieson continued to operate as late as 1870.[12]

Mackieson's surgical cases

Medical care in the 19th century

All 49 of Mackieson's cases (Table 1), occurred before Lister introduced the practice of aseptic surgery and many before the advent of anesthesia in Canada in 1847. Besides these circumstances, others made surgery a challenge. For example, the lack of a general hospital in Charlottetown before 1879 meant that Mackieson might have to operate in the home of the patient he was attending, in his own home or in a hotel. Nor were there any formally organized nurses or other health care professionals. Similarly, electric light and running water were not available in this period; on more than one occasion Mackieson described operating by candlelight. Care outside a hospital, however, was not completely disadvantageous, for many hospitals in the era preceding the work of people like Ignaz Semmelweiss,[13] Louis Pasteur[14] and Joseph Lister[15] were charnel houses in which suppurating wounds, spread by cross-infection, had a devastating effect on surgical outcome. And although diagnostic instruments such as the thermometer, laryngoscope and microscope did begin to advance clinical practice in the 19th century, they were incorporated into practice only slowly. Thus, it was not until 1842 — a quarter of a century after René-Theophile-Hyacynthe Laennec invented it[16] — that Mackieson, for example, first reported using the stethoscope in his practice.[17]

Hernia

Mackieson described 8 cases of hernia. The attendant pathophysiological problems were considerable. Frequently he was not contacted until the patient had been ill for some time, and his need to travel considerable distances over muddy or snowy roads to see some of his patients compounded the delay. Two of his cases illustrate these difficulties.

Case 15. Strangulated inguinal hernia, impending bowel infarction, and relief by operation

In May 1834 Mackieson was called to see a patient who lived 50 km from Charlottetown and who had been sick for 2 days with an apparently strangulated inguinal hernia. A local doctor had attempted taxis, performed phlebotomy and administered nicotine rectally without avail. The patient's complaint of thirst led Mackieson to give him soda draughts. Taxis was again unsuccessful. Because, as Mackieson noted, "the bowels had been down for 59

Table 1

Summary of Mackieson's 49 Surgical Cases, 1826–1857[1]

Diagnosis	No. cases	Etiology/pathology	Outcome
Multiple cases			
Hernia	8	Inguinal, 6, strangulated in 5; femoral, 1; umbilical, 1	Death in 5 (operative cases, 4)
Head injury	5	Seen at autopsy in 1	Death in 2 (hemorrhage)
Burn, scald	4	All in children	Death in 3
Fracture	4	Forearm, 1; leg, 3	Amputation in 2
Tumour	4	Malignant in 3 (lip, breast, penis)	
Knee disease	3	Probable tuberculosis, 1; remote trauma, 1; cartilaginous foreign body, 1	Eventual death in 1
Urinary retention	3	Probable prostatism	Death in 2
Abscess	2	Psoas, 1; thigh, 1	
Fistula lachrymalis	2		
Achilles tendon rupture	2	Treatment conservative	
Single cases			
Anthrax or carbuncle	1		
Chest trauma	1	Seen at autopsy	
Emphysema	1	Surgical trauma	
Fistula-in-ano	1		
Frostbite, limbs	1		Amputation, fingers
Hydrocele	1		
Orchitis	1	Trauma	
Pterygium	1		
Rectal prolapse, piles	1		
Staphyloma	1		
Urethral hemorrhage	1	Trauma	
Uvula, elongated	1		Excision

hours," surgical intervention was indicated. Mackieson described the operation and the immediate postoperative course as follows:

> I commenced the incision about half an inch above the neck of the tumour and continued downward to within an inch of the bottom of the scrotum, dividing in the first place the skin and fat with the external pudendal artery which I tied. ... In the second place [there was] the tendinous aponeurosis of the external oblique muscle. Then the membranous sheath of the cremaster thus exposing the spermatic cord and finding the sac of the peritoneum. When this last was punctured a considerable quantity of discoloured serum slightly tinged with blood escaped and I became alarmed lest I had punctured the intestine ... but [it] showed the intestine in two large convolutions within. Into this puncture of the sac, I introduced a divider, and ran a straight bistoury along it quite up to the ring. ... This I enlarged with the crooked bistoury and stuffed the intestine piece by piece elevating his breech and thighs as before. The intestine was all over a dark chocolate colour and shining like brown dulse. The wound was stitched with interrupted sutures and Plast Adhesive over which a soft compress of wool and a sprig truss [were placed]. Pulse 76 and good spirits. Had two stools three hours after the operation.[18]

Case 29. Strangulated hernia, operation declined at first so operation delayed and death

A 66-year-old woman whom Mackieson saw in October 1836 had had a small tumour in her groin for 20 years. In "assisting to raise an Ox" it became painful and tense and swelled to the size of a "pullet's egg." She also complained of pain and tension in the epigastrium. Although Mackieson thought that the bowel had not yet obstructed, he told his patient that there was no means of restoring her to health without an operation. However, she declined the advice and asked for a palliative remedy, so he gave her a purgative enema, a Seidlitz powder (sodium tartrate, tartaric acid and sodium bicarbonate) and 25 drops of laudanum by mouth. Three days later she agreed to the operation, but by this time her pulse rate was 120/min, she was thirsty and had been vomiting, and her bowels were inactive. At operation "the surface of the bowels thus exposed," wrote Mackieson, "resembled brown dulse — or a cake of chocolate." Mackieson attempted to repair the strangulated inguinal hernia, but the pathologic state was too advanced to permit recovery. Two days later, her weak and thready pulse was beating at 130/min, her countenance had shrunk and she was perspiring and incontinent. She died a few hours later.[19]

Comment. Of the 8 patients with hernia who Mackieson treated 5 died, and of the 6 who underwent surgery 4 died. The mortality is similar to that reported by Dennis for a series of strangulated hernias in the period from 1822 to 1858. Death was clearly related to the duration of strangulation; of the patients operated on, the mortality ranged from 19% on day 1 to 50% on day 4 of the illness.[20] As well as the avascular or frankly gangrenous state of the bowel, dehydration was a factor in Mackieson's patients. Some were bled and purged before surgery; and although intravenous resuscitation had been introduced when the cholera pandemic reached England in 1832,[21,22] it had not yet been incorporated into surgical practice. A masterly treatise on hernia by Sir Astley Paston Cooper, which was based on sound scientific principles and published in 1804,[23] was possibly one of the surgical texts from which Mackieson derived his knowledge and the basis of his management of hernia.

Burns and scalds

Mackieson described the course of 4 burn patients, 3 of whom died. The following case is an example.

Case 97. Burn of child in kitchen, treatment unsuccessful and death

In December 1841 while standing on part of a Franklin stove to reach a plate, a 3-year-old girl was burned; "her clothes were attracted by a draught and caught fire, which in an instant enveloped the child in flames." Another doctor saw the girl first and prescribed dressings of linseed oil and lime water, cotton cloth wrapping and "apple water acidulated with cream of tartar." She was restless and her pulse was difficult to feel when Mackieson saw her. He stayed with her for 5 hours, giving her warm arrowroot and laudanum and covering her with warm blankets. However, she died soon afterwards.[24]

Comment. Despite the high mortality, Mackieson's notes indicate that he had a sound understanding of the pathophysiology of burns. This is apparent in the comments he made at the end of the case report of the 3-year-old's injury:

> This is a case when death takes place from exhaustion, or from the shock received by the Nervous System, without the intervention of any inflammatory reaction — the child should have been nourished & supported with cordials, Laudanum & warm liquids from the beginning, till reaction could be brought about — instead of being kept all the while with only a sheet for a covering — & getting only cold drinks — under the idea that some Phantom called Inflammation was about to intervene — or that the symptoms of exhaustion were those of determination to the Brain — & that her dilated pupil anterior to dissolution was another proof of congestion there.

Fractures

The fractures Mackieson described were caused by serious injury, with consequent tissue damage and potential for slow and complicated recovery. Three cases are illustrative.

Case 91. Gunshot wound with compound fracture of bones of forearm, operation and recovery

A man sustained a bullet wound to his arm during a duck shoot some way off Charlottetown harbour in April 1841. His forearm was shattered and he had to bear the pain of the journey over water and road to receive medical attention. Mackieson operated by candlelight in the office

he had at his home and was assisted by his manservant. He found that "everything" was lacerated, and he noted that the patient "could not move a finger." Amputation just below the elbow appeared necessary. After applying a tourniquet over the brachial artery 3 fingerbreadths above the internal condyle of the humerus, he made use of "Sir Astley Cooper's recommendation of cutting at about one third of the way down the forearm, to avoid later sloughing of the tendons." He then ligated the radial, ulnar and interosseus arteries. Mackieson added that his patient did not lose "an ounce of blood" and bore the operation with "more than Roman fortitude."[25]

Case 24. Fracture of compound fracture of lower leg, débridement, immobilization and recovery

Hauling a load of wood over the ice in March 1936, a man fell and trapped his leg under the load. The tibia and fibula were fractured "a little lower than the middle of the leg." Mackieson removed the piece of bone manually, approximated the fractured bone ends "by extension to the leg and foot," debrided the wound and brought the edges of the wound together with interrupted sutures. He then immobilized the leg in a fracture box "in length about 18 inches — 5 deep & 6 broad, with an inclined board against the sole of the foot" (Fig. 1). On the third day the wound became infected and tense. Treatment included application of tincture of camphor and bran poultice. Formation of an abscess required lancing and an "extremely copious discharge" eventually abated.[26]

Case 115. Compound fracture of ankle, débridement, immobilization, gangrene and amputation.

A man sustained a comminuted fracture of his tibia in August 1843. Mackieson removed a piece of bone and immobilized the leg in a fracture box. On the third day the leg was swollen, tense and discoloured.

Distinct crepitus between the skin and the fascia indicated the presence of gangrene. Because the man's life was threatened, Mackieson amputated the leg at the thigh.[27]

Comment. The first of these case reports reiterates 2 points: the challenges of operating in a home as opposed to a hospital, with a lay person as assistant and Mackieson's familiarity with the teachings of Astley Cooper. The second testifies to Mackieson's fortitude. Until 1745 it was the usual practice to amputate injured limbs, but Percival Pott changed that when he insisted that his own injured leg not be amputated and then went on to survive conservative management.[28] However, this was not generally accepted. The development of sepsis in a wound was expected and considered laudable and certainly preferable to the complication of gangrene, which occurred in the third case. In that case Mackieson showed good judgement in amputating early rather than late.

Tumours

Among the 49 surgical cases were 4 cases of tumour. Those of the breast, penis and lip were probably cancerous. The benign tumour required nothing less than heroic surgery.

Case 141. Large tumour of thigh, excision with amputation and recovery

A "delicate" 40-year-old woman who consulted Mackieson in July 1845 presented with a tumour extending down one thigh. It had grown over 13 years, and eventually the "aching, distress and weight" led her to accept Mackieson's advice that he amputate the leg. The procedure was carried out in a hotel. The woman was placed on a table on a bed of pillows with a soldier on each side. She was plied with liberal amounts of brandy and water, but, as the operation proceeded, she became "very much exhausted ... and ... frequently exclaimed that she was going." Mackieson was assisted by 3 other doctors. The main technical difficulty was controlling the bleeding, and particularly securing the femoral artery. The tumour, which Mackieson thought was "of the encephaloid variety," was large; together with the leg it weighed 15 kg. The patient survived the ordeal, and 9 years later Mackieson added the note that "she is now alive, fat & well."[29]

Comment. The nature of the tumour is not clear; probably it was a benign soft-tissue lesion such as a

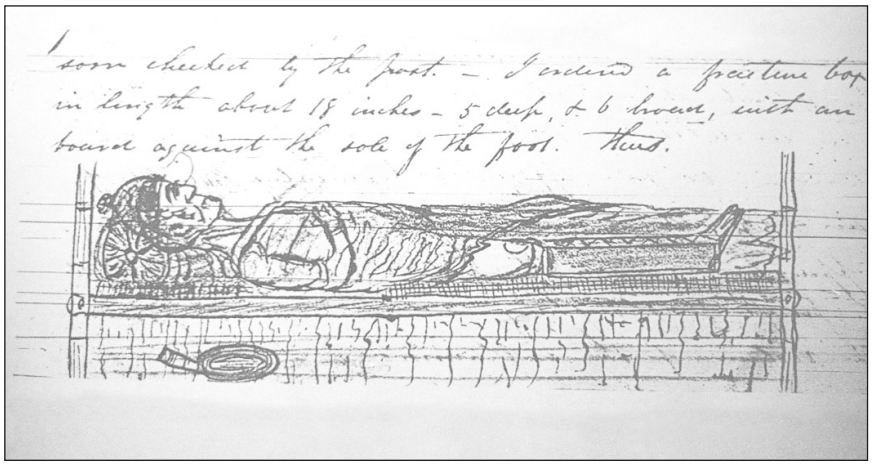

FIG. 1. Drawing by John Mackieson of a fracture box for the immobilization of leg fractures.[26] (Photograph courtesy of the Public Archives and Records Office of Prince Edward Island, Charlottetown.)

neurofibroma. Whatever its nature, the tumour required all of Mackieson's surgical skill — and the patient required all of her powers of endurance. This surgical feat seems worthy of the efforts of the great surgeons of the day, who operated with great dexterity and speed in those preanesthetic, pre-Listerian days.

Discussion

Mackieson's casebook illustrates some of the problems that bedevilled surgery in the first half of the 19th century. A first-hand account of surgery in a very small centre, it complements accounts in surgical textbooks. In the absence of anesthesia and asepsis, and dreading the occurrence of what Rhodes has termed the twin terrors of hemorrhage and infection,[30] surgeons restricted their procedures to lesions on the periphery of the body. Even then, as Youngson has pointed out, in managing a patient with an injured or diseased joint or limb, surgeons found amputation preferable to a complex, if primitive, rehabilitative procedure, for this might well be followed by death from shock or exhaustion.[31] The casebook is thus a testament to the practice of one surgeon in a small colonial outpost in an era when, as Youngson has added, the appalling strain of deliberately inflicting pain meant that few among even the greatest surgeons of the day can have enjoyed their work.[31]

Although Mackieson must have steeled himself to perform what Spencer Wells dubbed "tedious eviscerative vivisection,"[31] his surgical work provides evidence of those qualities so evident in the leading surgeons of his day: boldness, courage, dexterity and skill.[32] As his surgical case reports indicate, Mackieson had wide knowledge and good judgement; he was familiar with the current medical literature, frequently referring to authors whose works he had read. His practice therefore adhered to the norms of surgical practice, particularly those characterizing surgery in Great Britain. It is of interest, too, that the only textbook that is extant with Mackieson's own signature is a Scottish anatomy textbook.[33] Evidently the influences that shaped his surgical expertise were British rather than American.

Mackieson's casebook is significant because it is one of the few existing primary sources on the history of surgery in Canada. It is detailed and covers a wide range of cases. It shows how one Canadian surgeon solved problems some of which face today's surgeons, though he had available to him a base of science and technology that was quite different from that available 150 years later.

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