

RETROPERITONEAL ABSCESS

Soji F. Oluwole, MD, FRCS (C), FWACS, Ademakinwa Adekunle, MD, and Bade Akintan, MD
Ile-Ife, Nigeria

Perforated bowel or diseases of the retroperitoneal organs may be complicated by retroperitoneal abscess formation. Six cases of retroperitoneal abscess treated at Ife University Teaching Hospital, Ile-Ife, Nigeria, over a two-year period are reported. Delayed presentation was responsible for the only death in the series and was also associated with prolonged morbidity in the remaining five cases. Early presentation and diagnosis, use of appropriate antibiotics, and prompt surgical intervention are factors that appear to influence the morbidity of the disease.

Retroperitoneal abscess is a relatively rare but serious surgical infection associated with significant morbidity. The infection usually complicates perforations of adjacent bowels arising from neoplastic disease,¹⁻³ trauma,⁴ or inflammatory bowel diseases.⁵⁻⁷ The abscess may occasionally arise from renal diseases,^{6,7} empyema, or tuberculous osteomyelitis of the spine.¹ The insidious onset of the disease associated with delay in diagnosis influences its outcome. The clinical course of the underlying disease certainly contributes to the morbidity of the infection. A high index of suspicion in conjunction with adequate drainage and

coverage with the appropriate antibiotics has led to improved morbidity of retroperitoneal abscess in recent years.⁴

This report draws attention to the circumstances in which this clinical condition can present as an acute surgical emergency and discusses its diagnosis and management. Six cases of retroperitoneal abscesses seen over a two-year period at the University of Ife Teaching Hospital at Ife State Hospital, Ile-Ife, Nigeria, are described. Two cases resulted from perforated, gangrenous, retrocecal, acute appendicitis and a third one from perforated, strangulated Richter's lumbar hernia. The fourth patient had pyogenic iliopsoas abscess associated with ipsilateral hydronephrosis and primary pulmonary tuberculosis. Two of the cases were perinephric abscesses, one of which was a complication of hydronephrosis arising from calculus bladder neck obstruction; the other was not associated with any underlying disease. Two of the six cases had a staphylococcal abscess in the perinephric space and psoas sheath, respectively.

CLINICAL MATERIAL

The case reports of the six patients admitted to Ife State Hospital between January 1980 and January 1982 were reviewed. Special attention was paid to duration of illness, presenting symptoms, location and size of abdominal masses, etiologic organisms, radiologic diagnosis, treatment, and hospital course. Table 1 summarizes the clinical history and hospital course of the patients.

From the Departments of Surgery and Radiology, Faculty of Health Sciences, University of Ife, Ile-Ife, Nigeria. Requests for reprints should be addressed to Dr. Soji F. Oluwole, Department of Surgery, Faculty of Health Sciences, University of Ife, Ile-Ife, Nigeria.

TABLE 1. SUMMARY OF CLINICAL FEATURES OF THE CASES

Case (Age/Sex)	Site of Abscess	Underlying Disease	Etiologic Organism	Management	Complication	Outcome
1 (38 yr/M)	Right posterior retroperitoneum	Perforated appendicitis	E coli and enterococci	IV gentamicin, chloramphenicol, and penicillin; appendectomy and wide drainage of abscess	Septicemia, acute renal failure, and meningism	Died after 12 days
2 (31 yr/M)	Right posterior retroperitoneum	Perforated appendicitis	E coli, Klebsiella, and enterococci	IV gentamicin and flagyl; laparotomy, appendectomy, and wide drainage of abscess	Wound infection	Discharged after 34 days
3 (13 yr/M)	Left psoas sheath	Associated with primary pulmonary TB	Staphylococcus aureus	IV ampiclox; surgical drainage	Left hydro-nephrosis	Discharged after 18 days
4 (50 yr/M)	Left posterior retroperitoneum	Perforated strangulated lumbar hernia	—	IV gentamicin and clindamycin; surgical drainage, laparotomy, resection and anastomosis of infarcted small bowel	—	Discharged after 15 days
5 (40 yr/M)	Right perinephric space	Right hydro-nephrosis secondary to calculus bladder neck obstruction	Klebsiella and E coli	IV ampicillin changed to gentamicin and flagyl; cystolithotomy and surgical drainage	Acute renal failure, gram-negative shock	Discharged after 36 days
6 (60 yr/F)	Right perinephric space	Undetermined	Staphylococcus aureus	IV ampiclox; surgical drainage	—	Discharged after 28 days

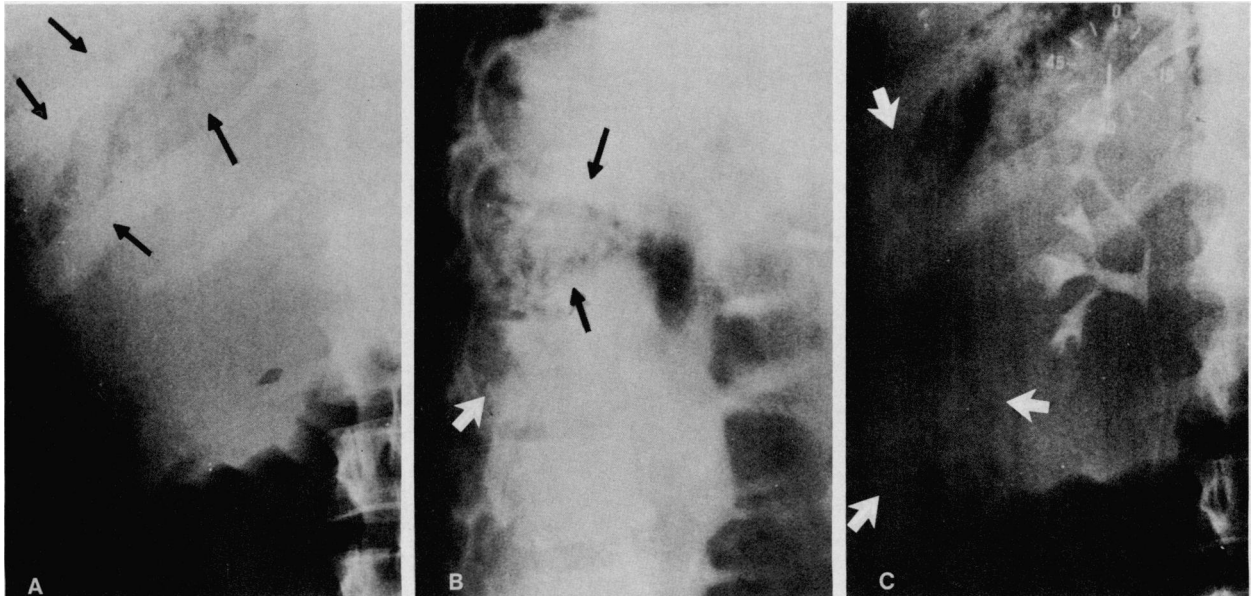


Figure 1 (Case 1). (A) Abdominal roentgenogram shows extraluminal mottled gas pattern extending from the lumbar area to the right upper quadrant (arrows). (B) Lateral view of abdominal roentgenogram demonstrates a posterior location of the abscess. (C) IVP demonstrates extraperitoneal gas outlining the right kidney and extending to the right lower quadrant (arrows), which reflects retroperitoneal abscess formation

CASE REPORTS

Case 1

A 38-year-old man presented with a ten-day history of abdominal pain radiating to the right flank, nausea, vomiting, progressive abdominal distension, dysuria, and fever. On examination, he appeared ill, drowsy, dehydrated, jaundiced, and febrile with temperature of 40 °C. The abdomen was diffusely tender with rebound in the right iliac fossa and tenderness in the right costovertebral angle. There was a warm, tender, firm 10 × 12 cm mass in the right flank. The skin over the mass was edematous. The bowel sounds were hypoactive. Urethral catheter passed on admission returned no urine. The plain abdominal x-ray film (Figure 1A) demonstrated an extraluminal mottled gas pattern extending from the lumbar area to the right upper quadrant. This was indicative of a right retroperitoneal abscess with a suggestion of a right subhepatic inflammatory pocket. The lateral view

(Figure 1B) demonstrated a posterior location of the lesion. The hematocrit was 52 percent; serum sodium, 152 mEq/L; potassium, 4.9 mEq/L; bicarbonate, 16 mEq/L; and chloride, 117 mEq/L. The creatinine was 2.1 mg/dL; blood urea nitrogen (BUN), 89 mg/dL; and WBC count, 17,900/ μL^3 with 93 percent neutrophils. The clinical impression was peritonitis and right perinephric abscess with prerenal azotemia.

The patient was resuscitated with intravenous fluids and started on parenteral ampicillin. An emergency intravenous pyelography (IVP), performed after adequate hydration, confirmed a right perinephric abscess (Figure 1C) and he underwent exploratory laparotomy 18 hours after admission. The findings were a large right retroperitoneal abscess extending from the iliac crest to the 12th rib that had perforated into the hepatorenal pouch and a perforated gangrenous retrocecal appendicitis with friable cecal wall. Appendectomy and tube cecostomy were performed. The abscess cavity was drained. The antibiotic coverage was changed from ampicillin to gentamicin and chlorampheni-

col. *Escherichia coli* and enterococci were cultured from the abscess. The patient continued to run a high fever and developed a stiff neck on the sixth postoperative day. Parenteral crystalline penicillin was added to the antibiotic treatment after performing lumbar puncture, which showed clear cerebrospinal fluid that grew no organisms. He died of septicemia and renal failure 12 days after admission.

Case 2

A 31-year-old man was admitted with a five-day history of abdominal pain radiating to the right flank. He later developed fever and abdominal distension associated with nausea and vomiting. On admission, he appeared ill and toxic with temperature of 39 °C. There was diffuse abdominal tenderness with rebound in the right iliac fossa. There was cellulitis of the skin over a palpable tender, warm 8 × 10 cm mass in the right flank. Bowel sounds were absent. The hematocrit was 42 percent, WBC was 18,700/μL with a shift to the left, and the BUN was 69 mg/dL. The plain abdominal x-ray demonstrated a soft tissue mass with mottled gas pattern in the right lower quadrant and effacement of the properitoneal fat and cecal ileus. A diagnosis of perforated appendicitis with peritonitis and retrocolic abscess was made. Laparotomy revealed free intraperitoneal pus and a large retrocecal abscess cavity containing the retrocecal perforated gangrenous appendix. Appendectomy, abdominal toileting, and dependent drainage of the abscess cavity were performed. Parenteral gentamicin and metronidazole were continued after the operation. The patient's hospital course was complicated by wound infection and he was discharged 34 days after admission.

Case 3

A 13-year-old boy was referred from a peripheral hospital with a two-week history of left flank

swelling associated with hip pain, weight loss, anorexia, fever, and inability to stand on the left leg. He was treated with intramuscular penicillin for one week without any improvement before his referral. On admission, he appeared ill, pale, and febrile with temperature of 38.5 °C. A palpable 12 × 8 cm, warm, tender, fluctuant mass was present in the left flank extending over the iliac crest to the anterior part of the upper thigh. He had severe lordosis and flexion deformity of the left hip. A clinical diagnosis of left psoas abscess was made and the patient was started on parenteral ampiclox (ampicillin and cloxacillin). At surgery, a left iliopsoas abscess extending from the lower pole of the kidney to the Poupart's ligament was found and drained. *Staphylococcus aureus* was cultured from the abscess while the stain and culture for acid fast bacilli were negative. Five days after surgery the BUN rose from the level on admission of 30 mg/dL to 80 mg/dL and the drainage from the abscess cavity became serous. An emergency IVP done on the following day to rule out retroperitoneal urine leak revealed no communication between the urinary system and the abscess cavity, but demonstrated ipsilateral hydronephrosis without any obstruction to the left ureter. Urinalysis showed sterile pyuria. The chest roentgenogram demonstrated changes suggestive of primary pulmonary tuberculosis. The roentgenogram of the dorsolumbar spine was normal. He was started on anti-tuberculous drugs on the basis of the chest radiological findings. He was discharged 18 days after admission with normal BUN and creatinine levels. The clinic follow-up revealed that he continued to gain weight and had an improved chest roentgenogram.

Case 4

A 50-year-old male presented with a five-day history of painful left flank swelling associated with abdominal pain, nausea, and vomiting. He moved his bowels on the day of admission. There was no previous history of left flank swelling. Physical examination revealed an ill and dehydrated patient with temperature of 37 °C. There was a palpable 8 × 8 cm, warm, tender mass in the

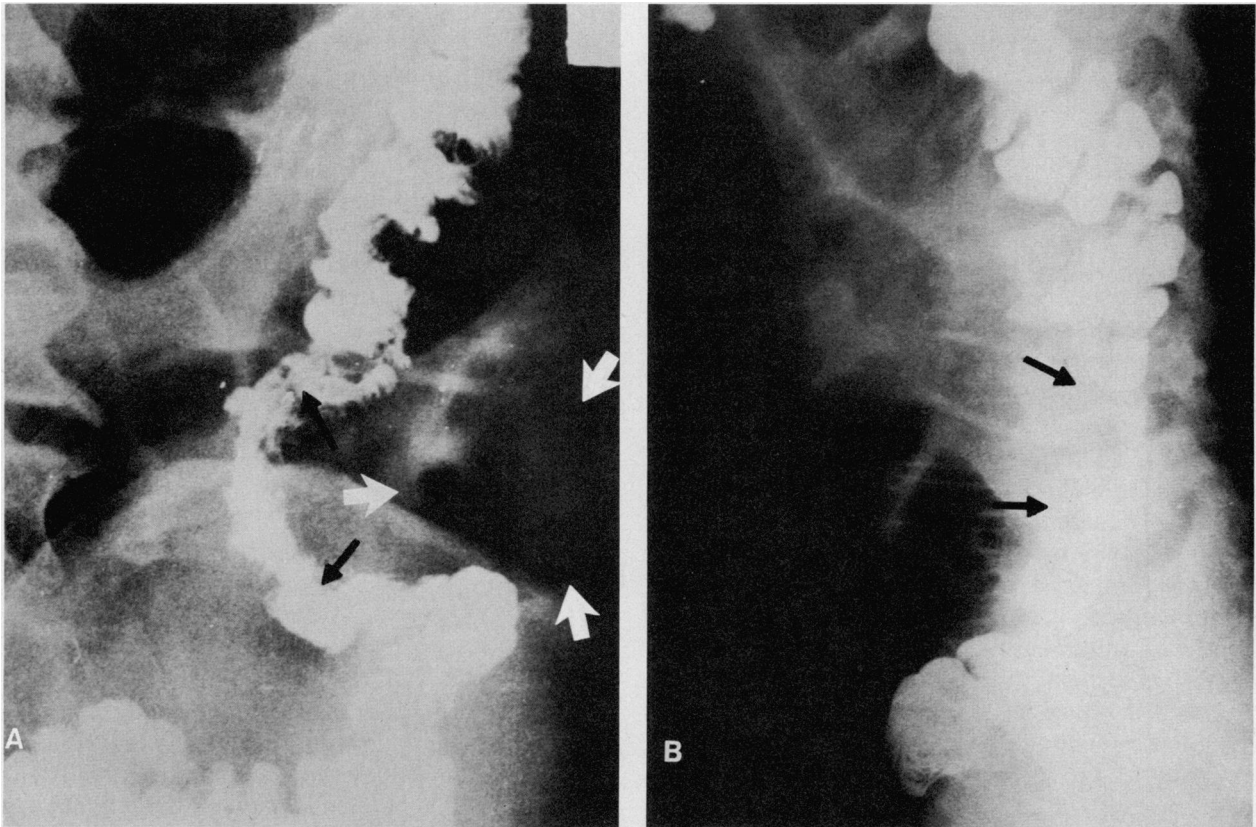


Figure 2 (Case 4). (A) Barium enema demonstrates an extrinsic mass impression on the descending colon (black arrows) and extraluminal gas (white arrows) in a left flank mass representing an abscess secondary to perforation of strangulated lumbar hernia. (B) Lateral view demonstrates the posterior location of the descending colon and the extrinsic mass impression (arrows)

left flank with edema of the skin. Bowel sounds were present. The abdominal x-ray film showed extraluminal gas shadow in a bulging left flank mass and a clinical diagnosis of left flank abscess probably secondary to perforated bowel was made. A limited barium enema (Figures 2A and 2B) demonstrated an extrinsic mass impression on the descending colon. The mass contained bowel loops and extraluminal gas. The valvulae conniventes of the proximal bowel were in relief, indicating obstruction. No intrinsic pathologic condition of the rectum and left colon was seen. A deep abscess cavity containing perforated small bowel from strangulated Richter's lumbar hernia was found during surgical drainage of the flank abscess. Laparotomy was then performed through

a midline incision for resection and end-to-end anastomosis of the perforated bowel. The patient was placed on parenteral gentamicin and clindamycin for seven days. The postoperative course was uncomplicated and he was discharged 15 days after admission.

Case 5

A 40-year-old man was transferred to Ife University Teaching Hospital from a peripheral hospital following laparotomy for a diagnosis of perito-

nitis secondary to perforated appendicitis. On admission to the referring hospital, he gave a six-day history of abdominal pain, fever, anorexia, vomiting, weakness, dysuria, and urinary frequency. He appeared ill, dehydrated, febrile with temperature of 39 °C, and had diffuse abdominal tenderness with rebound in the right flank. The findings at laparotomy were a huge cystic right kidney, serosanguinous peritoneal fluid, a hard mass in the bladder, and a normal appendix. At the time of transfer he was ill, confused, and toxic with temperature of 40 °C. He had a hematocrit of 35 percent and a WBC of 18,000/ μ L with a shift to the left. The BUN was 215 mg/dL; creatinine, 8.0 mg/dL; potassium 5.7 mEq/L; sodium, 138 mEq/L; and bicarbonate, 10 mEq/L. The plain abdominal roentgenogram and emergency infusion IVP revealed a large vesical calculus and bilateral hydronephrosis. He underwent cystolithotomy after instituting adequate hydration and parenteral ampicillin treatment. The patient developed postoperative diuresis with daily urine output of 5 to 7 liters. However, his temperature remained high while the creatinine and BUN returned toward normal values. A large, tender, fluctuant mass was observed in the right flank on the sixth day following cystolithotomy. Needle aspiration produced copious pus, and three liters of pus were drained from the right perinephric space through a right flank incision. He went into gram-negative shock immediately after surgery and responded to treatment with parenteral hydrocortisone, gentamicin and metronidazole. The culture of the abscess grew *Klebsiella* and *E coli*. He was discharged 36 days after admission with normal serum creatinine and BUN.

Case 6

A 60-year-old woman was referred from a peripheral hospital with a 20-day history of a painful right flank mass that had progressively increased in size. The swelling was associated with fever, loss of appetite, and malaise but not with dysuria or change in bowel habits. There was no history of trauma or skin infection. She had been treated with intramuscular penicillin for eight days

without improvement prior to her referral. She appeared ill, pale, and febrile with temperature of 38 °C on admission. A palpable 7 × 10 cm, warm, tender, fluctuant mass was present in the right flank. The abdomen was tender only in the right flank with right costovertebral angle tenderness, and bowel sounds were present. Needle aspiration of the mass yielded copious pus. At surgery, a large perinephric abscess was found and drained. She was treated with parenteral ampiclox. *Staphylococcus aureus* was cultured from the abscess. Postoperative IVP, barium enema, and upper GI series with small bowel follow-through demonstrated no significant abnormality. The patient was discharged 28 days after admission.

DISCUSSION

The retroperitoneal space is the area between the peritoneum and the transversalis fascia lining the posterior wall of the abdominal cavity. It extends from the parietes laterally at the lateral edge of the quadratus lumborum muscle to the diaphragm above and the pelvic brim below. The space is divided into two fossae or perinephric spaces occupying both sides of the abdomen. Each lateral fossa extends across the midline and is further subdivided by the renal fascia into an anterior and a posterior layer surrounding the kidney. The renal fascia compartment is closed superiorly and open inferiorly where the perirenal fat is continuous with the pelvic fat thereby favoring the spread of infection inferiorly. The contents of the space include the great vessels (abdominal aorta and inferior vena cava), lumbar plexus of nerves, kidneys, ureters, adrenals, pancreas, descending duodenum, and part of the colon. Most retroperitoneal abscesses are secondary to extension of inflammatory processes from these organs.

Abscesses in the retroperitoneal space may complicate perforated colonic carcinoma,¹⁻³ Crohn's disease of the bowel,⁵ diverticulitis,⁶⁻⁸ perforated appendicitis,^{1,9,10} or trauma.^{4,7} Suppurative iliac lymphadenitis has been reported as a rare cause of retroperitoneal iliac fossa abscess.¹¹ Other clinical conditions associated with the formation of retroperitoneal abscess include pyelo-

nephritis, renal carbuncle, tuberculosis, trauma, and cancer.^{1,6,7} The infection may occasionally result from tuberculosis or actinomycosis of the twelfth thoracic or lumbar vertebrae dissecting along the iliopsoas muscle and fascia, which frequently presents as psoas abscess above the Poupart's ligament¹ or may rarely present in the adductor triangle of the thigh.⁶

Two of the six cases in the present series developed their infection from perforated gangrenous retrocecal appendicitis. The reviews of Altemeier and Alexander,¹ Hardcastle,⁹ and Pierleoni and Johnson¹⁰ indicate that ruptured acute appendicitis is a common cause of this infection. The third patient developed the abscess from perforated strangulated lumbar hernia. It should be noted that 48 percent of 115 patients who developed gangrenous bowel in the recent report of Chiedozi, from Nigeria,¹² had strangulated hernia. A significant number of complications of strangulated hernia is still seen in hospitals all over Africa, contrary to what obtains in Europe or North America. It is therefore not surprising that case 4 had perforated lumbar hernia despite the fact that he denied any history of flank swelling.

One of the patients had pyogenic iliopsoas abscess, without an antecedent history of trauma or skin infection. The psoas abscess, however, was associated with ipsilateral hydronephrosis and primary pulmonary tuberculosis. Although tuberculous osteomyelitis of the thoracic or lumbar vertebrae has been reported as a cause of iliopsoas abscess,¹ there are no laboratory data to support a tuberculous origin for the abscess in this patient. His spinal roentgenogram was normal and the radiological finding of primary pulmonary tuberculosis in this patient may be coincidental. The ipsilateral hydronephrosis was probably secondary to ureter compression by the abscess. The post-operative IVP failed to demonstrate ureter compression because drainage of the abscess had relieved the obstruction.

Two of the six cases had right perinephric abscess with one case resulting from a complication of calculus bladder neck obstruction while the other had no underlying renal disease. Infected hydronephrosis or secondary infection of sequestered fluid from the hydronephrotic kidney may predispose to perinephric abscess formation. The other patient without any underlying disease or an antecedent history of trauma may have primary

pyogenic retroperitoneal abscess. Recent reports by Lam and Hodgson,⁴ Stevenson and Ozeran,⁶ and Finnerty et al¹³ have described primary pyogenic retroperitoneal abscesses without any underlying disease. The two cases of pyogenic abscess in the retroperitoneal space in the present series may belong to this group of patients without any predisposing infection.

This study comprised five men and one woman ranging in age from 13 to 60 years with a mean of 39 years. This confirms previous reports that show that the infection can occur in children⁷ as well as in elderly patients.² Fifty percent of the patients with nontuberculous psoas abscess reported by Rockwood, Monnet, and Rountree⁷ were children and the average age of the five patients with retroperitoneal abscess secondary to perforating colorectal cancer reported by Welch² was 79 years. Clinical manifestations of abscess formation are fever, pain, malaise, swelling, or a mass and leukocytosis. Fever, chills, malaise, abdominal pain, flank mass with tenderness, and leukocytosis with a shift to the left were present in all our patients. The two cases of perforated appendicitis were toxic and in septicemic shock on admission. The patient with pyogenic psoas abscess had flexion deformity of the hip. These findings are consistent with reported clinical features of the disease.^{1,4,7}

The bacteriologic studies in the two patients with perforated appendicitis revealed that the cultured organisms from the abscess were enteric organisms. The presence of coliforms and bacteroides in retroperitoneal abscess raises the suspicion of a gastrointestinal origin of the infection as has been demonstrated by other reports.¹⁻³ This study supports previous reports^{4,6,7,13} that show that staphylococcus aureus is the etiologic organism in primary retroperitoneal abscess. The primary disease appears to arise from blood-borne infections or infected hematoma in the perinephric space.

In 1937 Sperling and Rigler¹⁴ had described how retroperitoneal air outlines the right kidney in cases of ruptured duodenum. Recent reports^{1-3,6-8,11} also emphasize the role of radiographic studies in the diagnosis of retroperitoneal abscess. Alteration of the psoas shadow, scoliosis, loss of renal outline, soft tissue mass with medial displacement of the cecum, or descending colon and retroperitoneal air are radiologic evidence of retroperitoneal abscess. A soft-tissue mass was observed on

the abdominal x-ray film in the two patients with perforated retrocecal appendicitis. Three of the patients also had extraluminal gas present in the flank lateral to the cecum, ascending, or descending colon. Fecal material and gas in the cecum or the ascending or descending colon may simulate retroperitoneal abscess. This problem may be resolved if the clinical condition of the patient permits a barium enema examination to confirm the position of such mottled lucent densities as illustrated by case 4. The lateral view of the abdomen may be helpful in defining the position of a suspected retroperitoneal abscess. Of note, however, is the fact that posterior location of a lucent density does not necessarily place it entirely within the retroperitoneal space on the left side because of the posterior location of the descending colon as shown by Figure 2B.

The management of this infection consists of administration of intravenous fluids to correct fluid and electrolyte imbalance and appropriate antibiotic coverage followed by an early surgical drainage. All efforts must be made to treat the underlying disease at the time of operation in order to eliminate the source of infection. Laparotomy must be carried out to close or divert stool away from the perforated bowel if this is the underlying disease. Laparotomy is performed in conjunction with dependent drainage of the abscess cavity. A combined appendectomy with tube cecostomy in case 1 was performed because the base of the appendix was friable and the posterior wall of the cecum was involved in formation of retroperitoneal phlegmon. Tube cecostomy served to remove increased pressure of gas and feces in the region of friable bowel to prevent the development of fecal fistula. The appropriate antibiotic coverage for the infection secondary to perforated bowel is a combination of an aminoglycoside and metronidazole or clindamycin. The authors' experience indicates that parenteral ampiclox gives an adequate coverage to primary pyogenic retroperitoneal abscess.

The hospital stay of the five surviving patients ranged from 15 to 36 days with a mean of 26 days. The patients had symptoms of their disease for 5 to 20 days before seeking treatment. This delay in presentation adversely affected the morbidity of the infection. The late presentation usually results in severe dehydration, septicemia, and an extensive spread of the abscess in the retroperitoneal space with rupture of the abscess into the perito-

neal cavity as demonstrated by cases 1 and 2. The only death in the present report is the patient who delayed for 10 days with ruptured appendicitis before presentation. He had developed gram-negative septicemia and acute renal failure at the time of admission. Other reports have demonstrated that a delay in diagnosis and perforating colonic cancer in the elderly patients significantly influenced the mortality of the disease^{1,2} while an early institution of medical therapy has considerably improved the morbidity of the infection.^{4,6,7,13} Diagnosis and treatment must not be delayed if good results are to be obtained in the management of retroperitoneal abscess.

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