

Management and Treatment of Iliopsoas Abscess

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Hypothesis: Even with improved diagnostic modalities, the optimum management strategy for iliopsoas abscess (IPA) is not uniform, and a better understanding of treatment options is needed.

Design: Retrospective case series.

Setting: Academic center.

Patients: Sixty-one consecutive patients diagnosed as having IPA at the Mount Sinai Medical Center, New York, New York, from August 1, 2000, to December 30, 2007.

Main Outcome Measures: Development and cause of IPA, the need for additional interventions, morbidity, and mortality.

Results: The mean age of the patients was 53 years. Most patients were initially seen with pain (95% [58 of 61]), gastrointestinal tract complaints (43% [26 of 61]), and lower extremity pain (30% [18 of 61]). Primary and secondary abscesses occurred in 11% (7 of 61) and 89% (54 of 61), respectively. The most frequent underlying cause of secondary abscesses was inflammatory bowel disease.

Broad-spectrum antibiotics were prescribed in all patients. Computed tomography was the most common diagnostic modality used. Abscesses were larger than 6 cm in 39% of patients (24 of 61), bilateral in 13% (8 of 61), and multiple in 25% (15 of 61). Nine patients were treated using antibiotics alone, with a success rate of 78% (7 of 9). Forty-eight patients initially underwent percutaneous drainage, which was successful in 40% (19 of 48). Among those with unresolved IPAs, 71% of patients ultimately required surgery, and the IPAs were typically associated with underlying gastrointestinal tract causes. Seven percent (4 of 61) of patients directly underwent exploratory surgery and drainage, and all of these interventions were successful. The overall mortality was 5% (3 of 61).

Conclusions: Iliopsoas abscess remains a therapeutic challenge. Gastrointestinal tract disease is the most common cause, with computed tomography as the diagnostic modality of choice. Percutaneous drainage remains the initial treatment modality but is rarely the sole therapy required. Patients with inflammatory bowel disease are likely to require ultimate operative management.

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ILIOPSOAS ABSCESS (IPA) IS A RETROPERITONEAL collection involving the iliopsoas muscle. It was first described by Mynter¹ in 1881 as “psoitis” and remains a rarely reported condition. Two mechanisms lead to the formation of an IPA. It can be caused by contiguous spread of infected organs or by hematogenous spread from sites of occult infection owing to the rich vascular supply of muscles.² Therefore, many investigations have divided this condition into primary and secondary IPAs. Traditionally spread by spinal tuberculosis, the decline of this major pathogen in developed countries has affected the etiologic and epidemiologic findings of IPAs.

The classic triad of pain, fever, and limp, described by Mynter¹ in 1881, is atypical and is rarely seen.³ Iliopsoas abscess is commonly diagnosed via modern imaging techniques, such as ultrasonography, com-

puted tomography (CT), and magnetic resonance imaging. However, even with improved diagnostic modalities, the optimum management strategy is not uniform. Traditionally, it consists of broad-spectrum antibiotics, combined in most cases with drainage of the abscess through a percutaneous or an open technique. In this study, we review the experience with IPAs at our institution to describe this disease and to better understand the treatment options.

METHODS

A retrospective review of patients diagnosed as having an IPA and receiving treatment at the Mount Sinai Medical Center, New York, New York, from August 1, 2000, to December 30, 2007, was performed. Cases were identified through the use of a radiology database. Records were reviewed for patient demographics,

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Table 1. Initial Symptoms and Clinical Findings^a

Variable	No. (%) of Patients (N=61)
Fever >38.5°C	16 (26)
Pain	58 (95)
Weight loss	7 (11)
Lower extremity pain	18 (30)
Lower extremity edema	17 (28)
Gastrointestinal tract complaints	26 (43)
Palpable mass	8 (13)

^aBecause multiple statements are possible, values may total more than 61.

medical history, predisposing and initial features, diagnostic workup, laboratory results, microbiologic investigation, treatment options, and hospital course. A radiologist reviewed all radiologic studies to confirm the findings given in radiology reports. As a retrospective study, the treatment algorithm was based on physician judgment at the time of intervention. Institutional review board approval was obtained for this study.

Comparisons were made to find associations between treatment failure or success and clinical factors. These included patient age, concomitant disease, and size, number, and side of IPAs.

RESULTS

Iliopsoas abscess was diagnosed in 61 patients (32 men and 29 women) during the study period (August 1, 2000, to December 30, 2007). The mean age of the patients was 53 years (age range, 14-95 years). Nonspecific symptoms were found in most patients. **Table 1** summarizes the most common initial symptoms, including abdominal pain, other gastrointestinal tract complaints, and lower extremity pain. Only 26% (16 of 61) of patients were initially seen with fever (>38.5°C), and an elevated white blood cell count (>11 000/ μ L [to convert white blood cell count to $\times 10^9$ /L, multiply by 0.001]) was observed in 46% (28 of 61) of patients. Inflammatory markers such as erythrocyte sedimentation rate and C-reactive protein level, when obtained, were universally elevated in all patients.

Computed tomography was the most common (89% [54 of 61]) modality used to diagnose IPAs. Magnetic resonance imaging was used in 18% (11 of 61) and ultrasonography in 5% (3 of 61). The mean size of IPAs was 6 cm (range, 2.3-28 cm). Most patients (87% [53 of 61]) were initially seen with a unilateral abscess (**Table 2**). Multiple IPAs were found in 25% (15 of 61). The most frequent pathogens found in cultures were *Escherichia coli* and *Staphylococcus aureus*. In 10 patients, the cultures were sterile. Broad-spectrum antibiotic therapy was started in all patients and was appropriately corrected according to the microbiologic sensitivities.

The cause of the IPAs could be determined in 89% (54 of 61) of patients (**Table 3**). Gastrointestinal tract origins were most frequent, with cases of inflammatory bowel disease being the most prevalent among these. These cases primarily comprised Crohn disease abscesses secondarily involving the iliopsoas muscles. Bacteremic states were also a common cause of IPA. Several cases occurred after procedures or instrumentation injury or from other infected sources. Eight cases were secondary to immunocompro-

Table 2. Characteristics of Iliopsoas Abscesses

Characteristic	No. (%) of Patients (N=61)
Size, cm ^a	
<2	1 (2)
2-4	23 (38)
>4-6	13 (21)
>6	24 (39)
Side	
Unilateral	53 (87)
Bilateral	8 (13)
No. of iliopsoas abscesses	
Single	46 (75)
Multiple	15 (25)

^aThe mean was 6 cm.

Table 3. Concomitant Diagnoses Associated With Iliopsoas Abscesses

Cause	No. (%) of Patients (N=61)
Gastrointestinal (n=18)	18 (30)
Inflammatory bowel disease	14
Diverticulitis	2
Appendicitis	1
Pancreatitis	1
Immunosuppression (n=9)	9 (15)
Malignant neoplasm and chemotherapy	3
Posttransplantation	2
Human immunodeficiency virus or AIDS	4
Bacteremic (n=8)	8 (13)
Spontaneous (n=7)	7 (11)
Postprocedural (n=5)	5 (8)
Aortic surgery	3
Spinal surgery	1
Kidney transplantation	1
Metastatic malignant neoplasm (n=4)	4 (7)
Paraspinal abscess (n=4)	4 (7)
Orthopedic infection (n=4)	4 (7)
Pyelonephrosis (n=2)	2 (3)

mised states such as human immunodeficiency virus or AIDS. Historically, tuberculosis is a common cause of IPA; we had only 1 case of a tuberculous abscess originating from the spine. Eleven percent (7 of 61) of patients had primary IPAs having no associated or causal origin, and 89% (54 of 61) had secondary IPAs.

The mean duration of symptoms was 13 days, and the mean hospital stay was 25 days. The mean follow-up was 20 months (range, 0.4-87 months).

The patients were retrospectively divided into 3 treatment arms based on the initial therapeutic intervention. Nine patients (15%) were initially treated conservatively with antibiotics alone. Percutaneous drainage (PCD) was performed initially in 48 patients (79%). Four patients (7%) directly underwent exploratory surgery and open drainage. The treatment arms are summarized in **Table 4**.

In 9 patients who were treated with antibiotics alone, all but 1 had an abscess less than 3.5 cm ($P > .05$). The most common (44% [4 of 9]) cause was bacteremia. In 7 of 9 patients (78%), antibiotic therapy alone was success-

Table 4. Treatments and Outcomes of Iliopsoas Abscesses

Variable	No. (%) of Patients (N=61)
Antibiotic treatment alone	
No.	9 (15)
Success	7 (78)
Open drainage	
No.	4 (7)
Success	4 (100)
PCD	
No.	48 (79)
PCD alone	19 (40)
PCD with interval open drainage	21 (44)
Multiple PCDs	3 (6)
Overall mortality ^a	3 (5)

Abbreviation: PCD, percutaneous drainage.

^aOne occurred after the initial PCD treatment.

ful. Two patients required further therapy. One patient with AIDS had immunosuppression and ultimately needed CT-guided drainage. The other patient had an abscess associated with Crohn disease and ultimately required an intestinal resection with open drainage of the abscess as definitive therapy.

Forty-eight patients were initially treated with PCD. The mean abscess size was 7 cm. Percutaneous drainage alone was successful in only 40% (19 of 48) of patients, and these cases typically involved immunosuppressed or postoperative states. The postoperative cases occurred following spinal surgery, kidney transplantation, and aortic surgery. A paraspinal abscess, a perinephric hematoma, and a leak were subsequently noted after surgery. In almost all cases with a gastrointestinal tract origin, PCD was only a bridge to definitive therapy (13 of 14 patients). These cases were associated with Crohn disease (n=9), diverticulitis (n=2), appendicitis (n=1), and pancreatitis (n=1). Three patients required multiple PCDs. One patient with Crohn disease as the underlying cause of IPA underwent 4 PCDs and ultimately required open drainage of communicating colonic fistulas and of pelvic, anterior wall, and perianal collections. Another patient diagnosed as having pancreatitis developed a peripancreatic psoas abscess and underwent 3 PCDs.

Four patients directly underwent exploratory surgery for open drainage of their IPAs. The mean abscess size in this group was 4 cm. Two cases were associated with Crohn disease. The other 2 cases were due to spontaneous paraspinal abscess and infected joint disease. All of these patients were successfully treated with exploratory surgery and drainage.

The overall mortality was 5% (n=3), and deaths were associated with bacteremia, spontaneous abscess, and aortic surgery for mycotic aneurysm. Hospital courses were complicated by sepsis and organ failure.

COMMENT

We report a large series of cases that extends the literature on IPA in adults. The next largest documented study⁴ evaluated 40 patients. We describe 61 consecutive pa-

tients diagnosed as having IPA and our findings on their clinical courses, microbiologic causes, therapeutic approaches, and outcomes.

Historically, tuberculosis was the most common cause of IPA in the developed world.⁵ However, the cause of IPA is changing, and almost three-quarters of IPAs are due to hematogenous spread.⁶ In our series, the most common cause of IPA was continuous spread from gastrointestinal tract diseases, mainly Crohn disease. This could be related to the large number of patients treated for inflammatory bowel diseases at our institution. This is in agreement with the review by Ricci et al,⁷ which found Crohn disease, appendicitis, ulcerative colitis, diverticulitis, colon cancer, and vertebral osteomyelitis, in that order, to be the most common causes of IPA secondary to continuous spread.

Before the widespread use of modern imaging studies, many cases of retroperitoneal abscess were diagnosed at autopsy. Once an IPA is suspected, CT is the investigation of choice, with a high sensitivity rate approaching 100%.² Other diagnostic modalities such as plain abdominal radiographs, ultrasonography, and magnetic resonance imaging have not shown any advantage over CT in the diagnosis of IPA.² In our study, CT was the most common (89% [54 of 61]) diagnostic tool used to diagnose IPAs. Magnetic resonance imaging was mostly used in combination with other radiologic studies.

Once the diagnosis of IPA has been made, the cause should be determined before the initiation of treatment. The mainstays of IPA treatment are broad-spectrum antibiotic therapy and PCD.² Percutaneous drainage was first described in 1984.⁸ Undrained abscesses were associated with a high mortality rate. In our study, patients with bacteremia and small abscesses (<3.5 cm) responded well to antibiotic treatment alone. However, we did not find any statistical correlation between abscess size and treatment success. In general, it is unlikely that antibiotic therapy without drainage would be beneficial with large, complex, or loculated abscesses. Treatment options consist of percutaneous or open drainage. As a safe and minimally invasive alternative to open drainage, PCD is usually considered a first-line treatment option. Success rates of PCD treatment alone vary in the literature from 70% to 90%.^{9,10} Failure rates of PCD alone in our study were as high as 60% (29 of 48 patients), and 44% (21 of 48) of patients ultimately required open drainage. Most patients with an underlying gastrointestinal tract cause such as Crohn disease ultimately required operative management ($P < .05$). Therefore, it is important to surgically address the underlying gastrointestinal tract cause.

CONCLUSIONS

Because it is impossible at this point to establish a general treatment plan applicable for all patients, associated conditions should be considered when planning therapeutic management of IPA. Percutaneous drainage remains the primary initial treatment modality but is rarely the sole therapy required. Based on our findings, patients with inflammatory bowel disease are ultimately likely to require operative management. However, inter-

val PCD may be safely used as an initial treatment modality and is often followed by open drainage to address the underlying gastrointestinal tract causes.

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REFERENCES

1. Mynter H. Acute psoitis. *Buffalo Med Surg J.* 1881;21:202-210.
2. Taiwo B. Psoas abscess: a primer for the internist. *South Med J.* 2001;94(1):2-5.
3. Huang JJ, Ruaan MK, Lan RR, Wang MC. Acute pyogenic iliopsoas abscess in Taiwan: clinical features, diagnosis, treatments and outcome. *J Infect.* 2000; 40(3):248-255.
4. Baier PK, Arampatzis G, Imdahl A, Hopt UT. The iliopsoas abscess: aetiology, therapy, and outcome. *Langenbecks Arch Surg.* 2006;391(4):411-417.
5. Harrigan RA, Kauffman FH, Love MB. Tuberculous psoas abscess. *J Emerg Med.* 1995;13(4):493-498.
6. Gruenwald I, Abrahamson J, Cohen O. Psoas abscess: case report and review of the literature. *J Urol.* 1992;147(6):1624-1626.
7. Ricci MA, Rose FB, Meyer KK. Pyogenic psoas abscess: worldwide variations in etiology. *World J Surg.* 1986;10(5):834-843.
8. Mueller PR, Ferrucci JT Jr, Wittenberg J, Simeone JF, Butch RJ. Iliopsoas abscess: treatment by CT-guided percutaneous catheter drainage. *AJR Am J Roentgenol.* 1984;142(2):359-362.
9. Hamano S, Kiyoshima K, Nakatsu H, Murakami S, Igarashi T, Ito H. Pyogenic psoas abscess: difficulty in early diagnosis. *Urol Int.* 2003;71(2):178-183.
10. Cantasdemir M, Kara B, Cebi D, Selcuk ND, Numan F. Computed tomography-guided percutaneous catheter drainage of primary and secondary iliopsoas abscesses. *Clin Radiol.* 2003;58(10):811-815.