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A Dangerous Evolution of Retroperitoneal Infection to Infrarenal Abdominal Aortic Pseudoaneurysm: A Case Report

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Case Report

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Abstract

Background

Mycotic pseudoaneurysm of the infrarenal abdominal aorta is a rare and potentially fatal complication of infection. Early diagnosis can be challenging because clinical symptoms are often nonspecific, and initial imaging may demonstrate only inflammatory changes without aneurysmal formation. This case highlights the importance of recognizing evolving radiographic findings in patients with a history of recurrent infection.

Case presentation

A 46-year-old man with a history of recurrent pelvic abscesses secondary to diverticulitis presented with three days of back pain, nausea, and vomiting. Initial imaging demonstrated a retroperitoneal inflammatory mass encasing the infrarenal aorta without evidence of pseudoaneurysm. Repeat imaging two weeks later demonstrated interval development of a pseudoaneurysm, raising concern for an infected aortic process. The patient underwent midline exploratory laparotomy with definitive surgical management and subsequently completed six weeks of intravenous antimicrobial therapy. He had an uncomplicated recovery with resolution of the infection and no reported recurrence.

Conclusions

Mycotic pseudoaneurysm of the abdominal aorta should be considered in patients with systemic or localized infection and new, unexplained back or abdominal pain, particularly when inflammatory changes surround the aorta on imaging. Serial imaging may be critical for identifying rapid progression from periaortic inflammation to pseudoaneurysm formation. Early recognition and definitive surgical management combined with prolonged antimicrobial therapy can prevent rupture and improve outcomes.

BACKGROUND

Mycotic pseudoaneurysms are a rare but life-threatening form of infected arterial injury caused by hematogenous seeding, infection of a preexisting intimal defect, contiguous spread, or direct inoculation [1]. Predisposing factors include atherosclerosis, infective endocarditis, septic emboli, immunocompromised states, and preexisting aneurysms [1, 2]. The term “mycotic,” introduced by William Osler, refers to their mushroom-like appearance; however, most cases are bacterial rather than fungal [3].

These pseudoaneurysms most commonly affect the femoral artery (annual incidence 0.03–1%), with less frequent involvement of the aorta, intracranial, or visceral vessels [3]. Mortality varies by location: aortic 63–100%, intracranial 60–90%, and peripheral 0–15% [1]. Histologically, lesions contain compressed perivascular tissue, hematoma, and fibroinflammatory material. Multi-director computed tomography (MDCT) is the primary diagnostic modality, typically showing a saccular outpouching with irregular walls and surrounding soft tissue or edema; additional findings may include thrombosis, calcification, or gas [1]. MRI and angiography provide further characterization, while ultrasound is preferred in pediatric patients to avoid radiation [4].

Identification of the infectious source is critical. Common organisms include Staphylococcus, Salmonella, and Pseudomonas aeruginosa, with less frequent Streptococcus, Klebsiella, and fungal species [5–7]. Candida albicans is the most common fungal pathogen in graft-associated infection [8]. Gram-positive cocci account for 55% of cases (45% S. aureus, 10% Streptococcus), Salmonella 30–40%, and other bacteria 5–15%. Blood cultures are negative in 25–50% of cases, and the source remains unidentified in nearly one-third of patients [9].

Clinically, early symptoms include pain, nerve compression, swelling, malaise, weight loss, and fever, with later progression to septicemia, aneurysm expansion, rupture, or hemorrhage [1]. Laboratory findings may show neutrophilia (65–83%) and elevated ESR or CRP.

We report a case of infrarenal abdominal aortic mycotic pseudoaneurysm in a relatively young patient who presented with retroperitoneal abscess and sepsis, progressing to pseudoaneurysm formation. We also review prior cases to summarize patient characteristics, microbiology, imaging findings, and outcomes, emphasizing the importance of early recognition, prompt imaging, and combined surgical and antimicrobial management to prevent fatal complications.

CASE PRESENTATION

A 46-year-old Caucasian male presented with back pain, anorexia, nausea, and vomiting. His medical history included hypertension, alcohol use disorder, fatty liver disease, anxiety, and recurrent complicated diverticulitis. He experienced five episodes of diverticulitis complicated by pelvic abscess formation over two years, with the most recent episode occurring 8 months prior to presentation. These episodes were managed with percutaneous drainage procedures and culture-directed antibiotic therapy, with abscess cultures growing *Escherichia coli, Bacteroides species, and Streptococcus constellates*. He subsequently underwent elective laparoscopic-assisted low anterior resection, with pathology confirming diverticular disease. Review of prior abdominal imaging obtained during his most recent diverticulitis episode demonstrated normal abdominal and pelvic arterial vasculature with no evidence of aortic pathology, including redemonstration of chronic rectosigmoid colonic wall thickening. Antibiotic regimens included augmentin, ciprofloxacin, and metronidazole.

Initial laboratory evaluation demonstrated leukocytosis, hypokalemia, transaminitis, and elevated procalcitonin (Table 1). Cross-sectional imaging revealed a 5.0 × 4.3 × 4.0 cm retroperitoneal inflammatory mass encasing the infrarenal aorta with possible IVC involvement and associated mural thrombus causing approximately 50% luminal stenosis (Fig. 1). Given concern for both infectious and malignant etiologies, MRI and interventional radiology biopsy were pursued concurrently. MRI demonstrated a hyperenhancing hepatic lesion with severe steatosis and portal venous changes (Fig. 2), and image-guided biopsy

confirmed cirrhosis without evidence of malignancy. The retroperitoneal process was interpreted as near-resolution of the presumed abscess, with no gross or histopathologic evidence of active infection; therefore, biopsy specimens were not submitted for microbiologic culture. The patient was discharged with outpatient follow-up.

Table 1: Laboratory Findings at Initial Presentation
Legend: Summary of significant serum laboratory values acquired upon initial presentation to the hospital emergency department. The table displays the laboratory tests, patient values in correlation with a reference range and units of measurement.

Table 1
here

Lab test	Patient value	Reference range	Units of measurement
Metabolic/Electrolytes			
Sodium	137	136–145	mmol/L
Potassium	2.7	3.5–5.1	mmol/L
Chloride	97	98–107	mmol/L
CO2	25	22–29	mmol/L
Calcium	8.2	8.6–10	mg/dL
BUN	4	6–20	mg/dL
Creatinine	0.39	0.67–1.17	mg/dL
Glucose	115	74–99	mg/dL
Total protein	6.3	6.6–8.7	g/dL
Albumin	2.2	4.0–5.0	g/dL
Total bilirubin	1.0	≤ 1.2	mg/dL
Alkaline phosphatase	318	40 – 129	U/L
AST	87	≤ 41	U/L
ALT	74	≤ 41	U/L
GFR	> 60	≥ 60	ML/min/ 1.73 sq meter
Anion Gap	15	5–15	mmol/L
Metabolic/Endocrine			
Lactic acid	3.7	≤ 2.0	mmol/L
Hematology			
WBC	30.5	4–11	K/uL
RBC	3.34	4.60–6.20	M/uL
Hemoglobin	11.6	13.5–17	g/dL
Hematocrit	34.2	40–54	%
MCV	102.4	80–98	fL
MCH	34.7	26–34	pg
MCHC	33.9	31–37	g/dL
RDW	20.5	11.5–14.5	%
RDW-STDV	75.5	34–54	fL
Platelets	329	150–400	K/uL
MPV	12.0	8.5–12.5	fL
Neutrophils	85	50–70	%
Lymphocytes	9	20–40	%
Monocytes	4	2–8	%
Eosinophils	0	1–3	%
Basophils	0	0–1	%
Immature granulocytes	2	0–2	%
Absolute			
Neutrophils	25.88	1.80–7.70	K/uL
Lymphocyte	2.88	1.00-3.30	K/uL
Monocyte	1.20	0-0.80	K/uL

Lab test	Patient value	Reference range	Units of measurement
Eosinophils	0.03	0-0.45	K/uL
Basophils	0.08	0-0.20	K/uL
Immature granulocytes	0.46	0-0.31	K/uL
Inflammatory markers			
Procalcitonin	141.40	< 2.01	ng/mL

One month after discharge, surveillance imaging demonstrated a new 2.9 cm infrarenal aortic aneurysm with surrounding inflammatory change consistent with a mycotic pseudoaneurysm (Fig. 3), prompting vascular surgery consultation. Approximately one month after the surveillance imaging, the patient developed progressive abdominal pain, weight loss, night sweats, and fevers and was instructed to return to the hospital for urgent evaluation and emergent surgical management. While admitted, initial blood cultures were negative, and transthoracic echocardiography did not reveal any valvular vegetation. He was started on broad-spectrum antibiotic regimen (vancomycin, cefepime, and metronidazole) which were subsequently narrowed to ertapenem. Given the patient's poor dentition and concern for a possible odontogenic source of hematogenous infection, dental extraction was also performed for source control.

After eight days of antibiotic therapy, the patient underwent open repair with exploratory laparotomy, left axillo-bifemoral bypass, infrarenal aortic ligation and resection with omental flap coverage, and colostomy formation with washout. Postoperatively, he required prolonged mechanical ventilation with eventual tracheostomy. Post-operation day twelve, the patient was found to have a 5.7 x 2.4 x 5.5 cm fluid collection in the right mons pubis superior to the femoral-femoral bypass graft status post drainage which grew Candida glabrata, prompting initiation of micafungin in addition to ertapenem. Resected aortic tissue showed necrotic aneurysm without any microorganism growth on tissue culture. Post operation day 18, blood cultures later grew Staphylococcus epidermidis attributed to PICC line infection, which was removed, followed by 2 weeks of IV vancomycin. He completed 6 weeks of ertapenem and micafungin followed by a 30-day oral regimen of fluconazole, metronidazole, and trimethoprim-sulfamethoxazole. Following completion of therapy, the patient remained clinically stable without evidence of recurrent infection and continued regular outpatient follow-up with his primary care physician. The patient had agreed to publish their case details and images, and consent was obtained.

DISCUSSION/CONCLUSION

Management of mycotic pseudoaneurysms depends on location, severity, and surgical expertise [1]. Treatment typically includes 6–8 weeks of antibiotics with endovascular repair, embolization, or open surgery [2, 3, 9]. Surgical debridement with resection of infected aorta remains the gold standard [6]. Procedures may involve repair, ligation, anastomosis, transplantation, or excision, with increasing use of endovascular stent-grafting due to its minimally invasive approach, shorter operative time, and faster recovery. Graft selection is individualized, including rifampin-soaked Dacron, cryopreserved aortic grafts, or femoral vein grafts [3]. In our patient, the surgeon likely chose to perform extra-anatomic bypass over in-situ reconstruction due to the latter carrying a high risk of reinfection.

Culture-negative mycotic pseudoaneurysms present both diagnostic and treatment challenges and may result from prior antimicrobial therapy or a low microbial burden. In these cases, the diagnosis is based on the overall clinical presentation, imaging findings, operative findings, and histopathology rather than tissue cultures alone. Broad-spectrum antimicrobial therapy should be started initially and then tailored according to blood cultures or cultures from other infectious sites when available. Although our patient's resected aortic tissue cultures were negative, treatment was guided by the overall clinical picture, subsequent microbiologic findings, and definitive surgical source control.

All interventions carry significant risk, including post-implantation syndrome, malposition, embolization, organ infarction, renal failure, graft failure, and para-aortic leak or fistula [1]. Infected grafts may be fatal if not removed; persistent infection may require extra-anatomic bypass, while untreated pseudoaneurysms risk rupture, hemorrhage, and sepsis.

In this patient, a retroperitoneal hypodense mass initially interpreted as an abscess appeared to resolve during biopsy attempt. Follow-up imaging demonstrated a new infrarenal aortic pseudoaneurysm at the same site, suggesting early aortic infection or contained perforation. This is likely due to contiguous spread of retroperitoneal infection to the adjacent aortic wall, resulting in a mycotic pseudoaneurysm despite negative aortic tissue cultures. This progression underscores evolution of retroperitoneal inflammation to vascular infection despite negative cultures and highlights the need for close imaging surveillance and early surgical consultation in patients with prior intra-abdominal infection to prevent catastrophic complications.

Despite extensive research on mycotic pseudoaneurysms in the aortic arch and thoracic aorta, abdominal aortic involvement remains poorly characterized. Our literature review identified 24 cases of abdominal aortic mycotic pseudoaneurysm (Table 2). Most patients were male (79%) and aged 60–80 years, in contrast to our younger patient with a history of alcoholic fatty liver, recurrent diverticulitis, and pelvic abscesses. Seven patients developed pseudoaneurysms following BCG therapy, and other bacterial and fungal organisms were also implicated, highlighting the importance of blood cultures to guide targeted antimicrobial therapy.

*Table 2**:** Literature Review of Abdominal Aortic Mycotic Pseudoaneurysms*

Legend: Reported cases of abdominal aortic mycotic pseudoaneurysm identified through literature review, including patient demographics, aneurysm characteristics, infectious etiology, management strategies, and clinical outcomes. Case 25 represents our patient. ***Abbreviations:*** *EVAR, endovascular aneurysm repair; BCG, bacillus Calmette–Guérin; LTAC, long-term acute care facility; PTFE, polytetrafluoroethylene; M. tuberculosis, Mycobacterium tuberculosis; MSSA, methicillin sensitive staphylococcus aureus; MRSA, methicillin resistant staphylococcus aureus; COPD, chronic obstructive pulmonary disease; Strep.*

pneumoniae, Streptococcus pneumoniae. ***Case Sources:*** *Patient 1 = Coelho et al. [9]; Patient 2 = Jones et al. [10]; Patient 3 = Jones et al. [10]; Patient 4 = Jones et al. [10]; Patient 5 = Barry et al. [11]; Patient 6 = Shimogawara [12]; Patient 7 = Perdomo et al. [13]; Patient 8 = Tehrani et al. [14]; Patient 9 = Flynn et al. [15]; Patient 10 = Banks et al. [16]; Patient 11 = Kahn et al. [17]; Patient 12 = Ryu et al. [18]; Patient 13 = Ravindra et al. [19]; Patient 14 = Kusakabe et al. [20]; Patient 15 = Adeeb et al. [21]; Patient 16 = Marek et al. [22]; Patient 17 = Vilares et al. [23]; Patient 18 = Gamble et al. [24]; Patient 19 = Liechty et al. [25]; Patient 20 = Seretis et al. [26]; Patient 21 = Simar et al. [27]; Patient 22 = Stokes et al. [28]; Patient 23 = Sato et al. [29]; Patient 24 = Falkensammer et al. [30]; Patient 25 = Our patient*

Table 2 here

Case	Age	Sex	Comorbidities	Size (mm)	Location	Source	Treatment	Outcom
1	83	M	Recurrent back pain	40	Terminal aorta	*M. tuberculosis*	Open aorto-bi-iliac graft; oral anti-tuberculosis treatment for 1 year	Asympt
2	64	F	Not mentioned	Not mentioned	Infrarenal	Fever of unknown origin	EVAR, open repair; Augmentin	Persiste
3	80	M	Not mentioned	Not mentioned	Infrarenal	*Salmonella*	EVAR, metronidazole	Survive
4	40	M	Not mentioned	Not mentioned	Infrarenal	Pneumococcal sepsis	EVAR, femoral-femoral bypass, Augmentin	Recover
5	82	M	Misdiagnosis of pericarditis	Not mentioned	Aortic bifurcation	*Salmonella* species.	EVAR, embolization; antibiotics	Dischar
6	74	F	Hypertension, hyperlipidemi	29	Thoracoabdominal	Aortic mural sarcoma	Open resection with graft, broad-spectrum antibiotic	Died da
7	74	M	Bladder cancer, bacteremia	Not mentioned	Multilevel aorta	Gram-negative sepsis	Stenting, no antibiotic prescription mentioned	Outcom
8	73	M	Bladder cancer, cystoprostatectomy	Not mentioned	Infrarenal	Intravesical BCG	EVAR, retroperitoneal drain	No recu
9	72	M	Transitional cell carcinoma of bladder	28	Infrarenal	Intravesical BCG	Emergency EVAR; antituberculosis medication	Recover
10	57	F	Hepatitis C, cirrhosis, hypertension, IV drug abuse	Not mentioned	Thoracoabdominal	MSSA	Rifampin-soaked Dacron graft; rehab, rifampin and nafcillin	Died at
11	64	F	COPD	42	Infrarenal	*Escherichia. coli*	Stent, levofloxacin	Recover
12	36	M	Thoracic spinal fusion	Not mentioned	Abdominal aorta	MRSA psoas abscess	In-situ graft; 11 months systemic vancomycin post-operative	Asympt
13	70	M	Not mentioned	42x46x25	Infrarenal	*Salmonella. paratyphi*	Patient denied EVAR; ceftriaxone for 6 weeks	Improve
14	76	M	Hypertension, Diabetes, hyperostosis	Not mentioned	Abdominal (L3)	BCG spondylitis	Open graft; rifampin, ethambutol, and isoniazid (40 days)	Transfe
15	52	M	Not mentioned	80	Abdominal	*Salmonella*	Excision and graft; ceftriaxone (2 weeks)	Died (ac
16	67	F	Spinal stenosis	40	Supraceliac	*Strep. pneumoniae*	Femoral vein conduit; 6 weeks of penicillin infusion	Well at 3
17	71	M	Diabetes, hypertension	45	Distal abdominal	BCG	EVAR; isonazid, ethambutol, rifampicin (BCGitis)	No com
18	65	M	Bladder cancer status post TURBT	Not mentioned	Infrarenal	BCG	Open repair; empiric antibiotics, Voractiv	Recover
19	82	M	Hyperlipidemia, bladder cancer	14	Abdominal	*Mycobacterium bovis* (BCG)	EVAR; Ethambutol, isoniazid, rifampin, moxifloxacin (18 months)	Dischar
20	79	M	total cystectomy	Not mentioned	Aortic bifurcation	Aorto-ureteric fistula	EVAR; no antibiotic therapy discusses	Stable
21	78	M	Bladder cancer, hypertension, atrial fibrillation	70x70x73	Abdominal	*Mycobacterium. bovis* (BCG)	Open graft and, antimycobacterial therapy	No relap
22	67	M	Kidney disease, hypertension, aortic aneurysm repair	118x143	Infrarenal	*Coxiella burnetii*	Open redo and renal reconstruction; zosyn and vancomycin; doxycycline and hydroxychloroquine for q-fever	Died at 1 Embolis
23	69	M	Not mentioned	35	Infrarenal	*Hemophilus. influenzae*	PTFE graft; minocycline hydrochloride	Stable

Case	Age	Sex	Comorbidities	Size (mm)	Location	Source	Treatment	Outcom
24	61	M	Not mentioned	67x55	Thoracoabdominal	Spinal tuberculosis	Aortic homograft, pyrazinamide, isoniazid, rifampin, ethambutol	Dischar
25 (Our patient)	46	M	Hypertension, alcohol abuse, fatty liver, pelvic abscesses, recurrent diverticulitis	29x29.6	Infrarenal	Severe sepsis (colitis, ileitis, intra-abdominal abscess)	Extra-anatomic reconstruction and intra-abdominal source control	LTAC; er vancom prophyl bactrim

Endovascular aneurysm repair with stent-grafting was most commonly employed, though one patient required conversion to open repair due to endoleak [10]. Given the severity of our patient's sepsis and extensive retroperitoneal inflammation, a more aggressive approach with extra-anatomic reconstruction and intra-abdominal exploration was necessary. Most patients in the literature achieved favorable outcomes, though four deaths were reported, attributed to comorbid conditions rather than procedural complications.

Overall, abdominal aortic mycotic pseudoaneurysms are rare, life-threatening infections with high morbidity and mortality when diagnosis is delayed. This case underscores the importance of early recognition, prompt imaging, targeted antimicrobial therapy, and individualized surgical planning in preventing morbidity and mortality from abdominal aortic mycotic pseudoaneurysms.

Abbreviations

BCG
Bacillus Calmette—Guérin
IVC
Inferior vena cava
MDCT
Multidetector computed tomography
PICC
Peripherally inserted central catheter
S. aureus
Staphylococcus aureus
S. epidermidis
Staphylococcus epidermidis
E. coli
Escherichia coli

Declarations

Ethics approval and consent to participate

Institutional review board approval was not required for this case report in accordance with institutional policy. Patient consent was obtained for drafting this case report.

Consent for publication

The authors of this study confirm that a written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief upon request.

Availability of data and materials

All data relevant to this case report are included in the article. Additional deidentified information is not publicly available to protect patient privacy but may be available from the corresponding author on reasonable request, subject to institutional requirements.

Competing interests

The authors declare that they have no competing interests.

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RR contributed to research and data acquisition, manuscript development and writing, and final review and approval. Accepts accountability for the accuracy and integrity of the work.

SZ contributed to research and data acquisition, manuscript development and writing, and final review and approval. Accepts accountability for the accuracy and integrity of the work.

CD contributed to research and data acquisition, manuscript development and writing, and final review and approval. Accepts accountability for the accuracy and integrity of the work.

VO contributed to research and data acquisition, manuscript development and writing, and final review and approval. Accepts accountability for the accuracy and integrity of the work.

BC contributed to research and data acquisition, manuscript development and writing, and final review and approval. Accepts accountability for the accuracy and integrity of the work.

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Use of artificial intelligence-assisted technology

ChatGPT was used for language editing and to reorganize the manuscript according to the journal's formatting requirements. It was not used to generate or analyze patient data. The authors reviewed and verified the final manuscript and accept responsibility for its content.

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Figures



Figure 1

Retroperitoneal Mass Encasing the Infrarenal Aorta

Legend: CT abdomen and pelvis where the red arrow points to a hypodense mass measuring 5.0x4.3x4.0 cm encasing the infrarenal abdominal aorta.

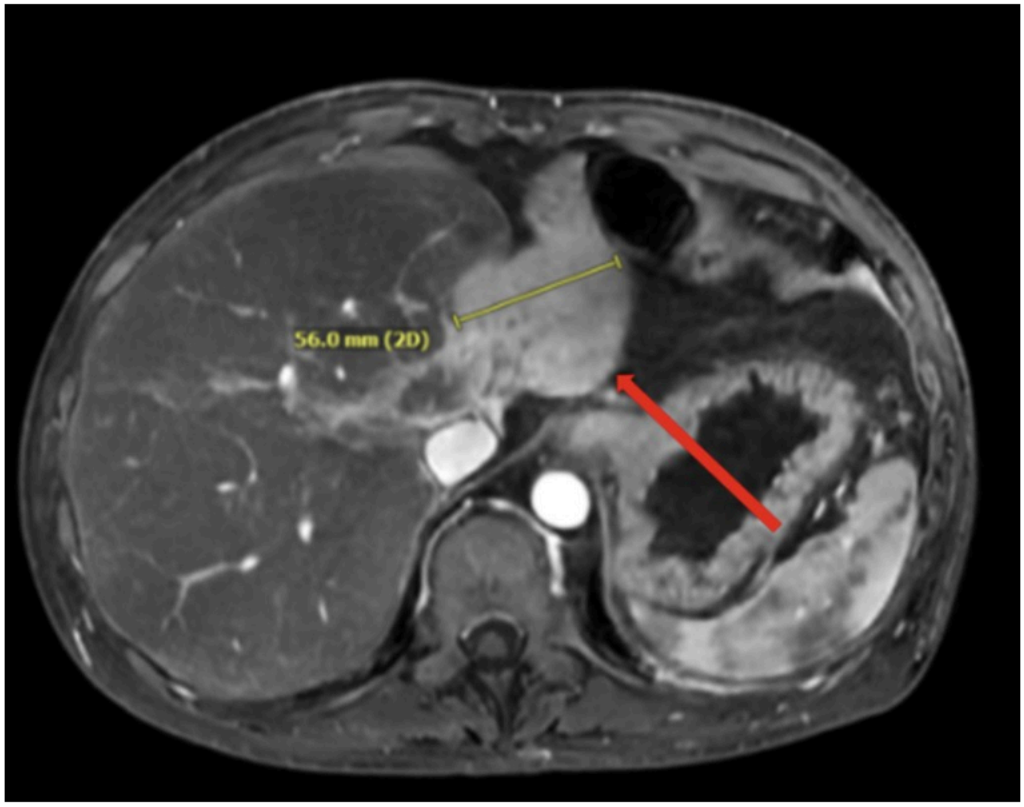


Figure 2

Left Hepatic Lobe Mass and Portal Vein Atrophy

Legend: Magnetic Resonance Imaging of the liver. The red arrow points to the hyper-enhancing mass found on the left lobe of the liver measuring 56 mm. Concurrent atrophy of the portal vein is also seen.

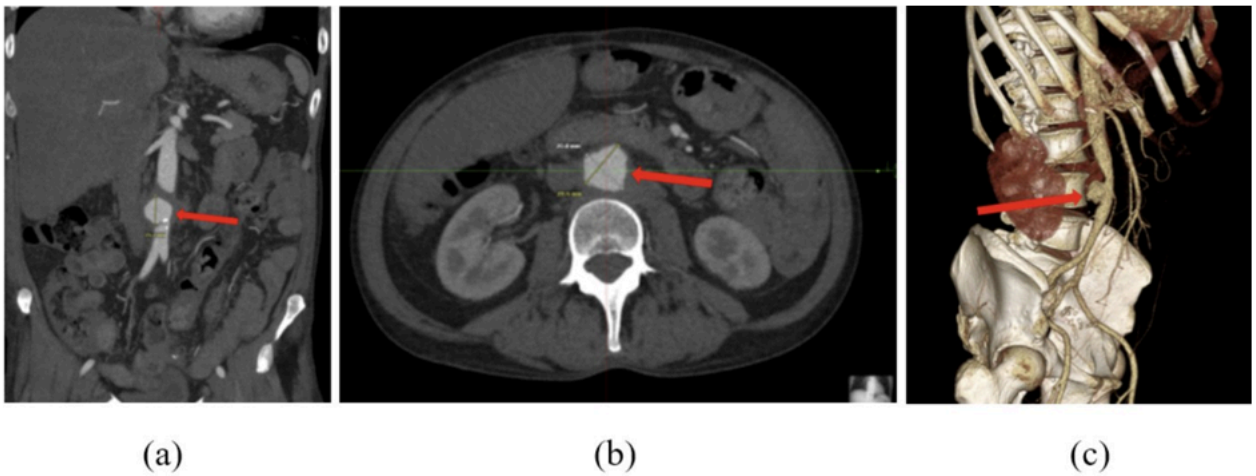


Figure 3

Infrarenal Aortic Mycotic Pseudoaneurysm on CT Imaging

Legend: CT abdomen/pelvis with 3D reconstruction demonstrating infrarenal aortic mycotic pseudoaneurysm identified one month after biopsy showed resolution of the retroperitoneal process. Coronal (a) and transverse (b) CT slices showing the 25.7 mm mass within the infrarenal abdominal aorta, and the 29x29.6 mm mass around the same area apprehensive of rupture, respectively. (c) shows a 3D image of the pseudoaneurysm.