American College of Radiology
ACR Appropriateness Criteria®

Radiologic Management of Infected Fluid Collections

Variant 1: Patient with right lower quadrant abdominal pain, fever, and leukocytosis for 7 days. Physical examination shows no peritoneal signs. CT scan shows a thin-walled fluid collection, greater than 3 cm, adjacent to the cecum, nonvisualization of the appendix, and an appendicolith. Imaging findings are highly suspicious for appendicitis. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Conservative management only	Usually not appropriate	Limited	N/A	N/A	3	3	1	4	5	1	2	1	0	0	0

References	Study Quality
28 (16498095)	3
27 (16322960)	2
2 (24293807)	4

Surgical drainage	May be appropriate	Limited	N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
30 (6709901)	4
29 (21299091)	2
31 (29180172)	4

Needle aspiration	May be appropriate	Limited	N/A	N/A	5	5	0	1	0	1	6	2	3	0	0

References	Study Quality
28 (16498095)	3
27 (16322960)	2
2 (24293807)	4

Percutaneous catheter drainage followed by delayed surgery	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	1	3	3	3	3

References	Study Quality
17 (20149402)	Inadequate
26 (22249438)	2
16 (16175691)	3
20 (17390174)	4
22 (22052039)	2
23 (11867780)	4
24 (17032194)	2
25 (21286921)	4
18 (27756361)	3
19 (29431586)	4
21 (29361105)	4

Percutaneous catheter drainage only	Usually appropriate	Strong	N/A	N/A	8	8	0	0	1	0	1	3	1	6	1

References	Study Quality
12 (10826415)	3
13 (8320186)	3
11 (12093344)	2
14 (12525909)	3
8 (22821308)	2
15 (23575402)	2
2 (24293807)	4
9 (28151844)	3
10 (16091990)	3

Variant 2: Patient with a history of left hemicolectomy 2 months ago for colon carcinoma. Two weeks after placement of a drain into an abdominal abscess; the patient presents with abdominal pain and fever. Drain output is 25 cc per day and the collection is unchanged in size by CT. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Catheter upsizing	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	0	3	7	3
	References	Study Quality													
	33 (20173165)	2													
	32 (14736682)	3													
Continued antibiotics and drain removal	Usually not appropriate	Limited	N/A	N/A	2	2	4	7	2	0	0	0	0	0	0
	References	Study Quality													
	2 (24293807)	4													
Continued antibiotics and drainage (no change in care)	May be appropriate	Limited	N/A	N/A	5	5	0	3	2	1	6	1	0	0	0
	References	Study Quality													
	47 (1719787)	2													
	48 (1627886)	4													
	23 (11867780)	4													
Intracavitary thrombolytic therapy and drainage	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	1	1	1	8	2	0
	References	Study Quality													
	40 (21482136)	4													
	34 (18372451)	4													
	36 (18309017)	3													
	37 (20036149)	4													
	38 (19190912)	1													
	39 (18503906)	1													
	41 (17867950)	1													
	35 (30202126)	4													
Laparoscopic drainage	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	0	3	11	0	0	0

References	Study Quality
42 (11083215)	4
43 (15616752)	4

Open surgical drainage	May be appropriate	Limited	N/A	N/A	6	6	0	0	2	4	0	7	0	0	0

References	Study Quality
46 (2479049)	4
44 (8607582)	4
45 (-3148208)	4

Variant 3: Patient who is an intravenous drug abuser presents with fever and tachycardia and on imaging is found to have 2 noncommunicating splenic abscesses accessible percutaneously through a 1 cm rim of normal splenic tissue. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Conservative management only	Usually not appropriate	Limited	N/A	N/A	3	3	2	3	5	1	2	0	0	0	0

References	Study Quality
55 (29666665)	4
57 (30326233)	4

Needle aspiration	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	1	4	7	1	0	0

References	Study Quality
54 (19070526)	4
56 (30244225)	4

Percutaneous catheter drainage only	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	1	0	1	4	7	0

References	Study Quality
51 (16489650)	3
52 (16676856)	2

53 (20152354)	4
49 (21319348)	4
50 (30187605)	4

Splenectomy	Usually appropriate	Limited	N/A	N/A	7	7	0	0	0	0	0	6	8	0	0

References	Study Quality
55 (29666665)	4
50 (30187605)	4
54 (19070526)	4

Variant 4: Patient with abdominal pain radiating to the back 5 weeks after hospitalization for acute pancreatitis. Afebrile. CT scan shows a walled-off collection in the body of the pancreas indenting a broad portion of the body of the stomach, affecting the gastric outlet. The collection is percutaneously accessible with a 3-cm window. MR cholangiopancreatography shows a patent pancreatic duct.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Conservative management only	Usually not appropriate	Limited	N/A	N/A	3	3	0	3	4	3	2	0	1	0	0

References	Study Quality
70 (11437038)	3
71 (17219288)	4
72 (10102326)	3
64 (1702557)	4
59 (27163588)	4

Endoscopic cystgastrostomy	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	0	1	12	0

References	Study Quality
62 (11818936)	3
63 (10744807)	3
61 (23732774)	1

Percutaneous catheter drainage only	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	0	3	4	3	3	0

References	Study Quality
67 (8995072)	4
62 (11818936)	3
68 (1734573)	4
69 (3357953)	4
64 (1702557)	4
65 (24315454)	3
66 (30146334)	3

Percutaneous needle aspiration	May be appropriate	Limited	N/A	N/A	4	4	0	2	2	4	4	1	0	0	0

References	Study Quality
73 (12607787)	4
74 (24955337)	4
75 (12911171)	4

Surgical cystenterostomy	May be appropriate	Limited	N/A	N/A	6	6	0	0	1	0	5	2	3	1	1

References	Study Quality
60 (26900288)	4

Variant 5: Patient with a 2 week history of cough, fever, and foul-smelling sputum. Worsening condition despite a full course of broad-spectrum antibiotics. Sputum cultures negative. CT scan shows a right lower lobe abscess. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Another course of antibiotics and postural drainage	May be appropriate (Disagreement)	Expert Opinion	N/A	N/A	5	5	0	4	4	2	0	3	1	0	0

References	Study Quality
83 (17273583)	4

77 (1987590)	4
78 (3977469)	4
76 (26366400)	4
80 (22347342)	4

Needle aspiration	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	0	0	7	2	3	1	0	0	0
Percutaneous catheter drainage only	May be appropriate	Limited	N/A	N/A	6	6	0	1	0	0	1	5	2	3	1

References	Study Quality
77 (1987590)	4
78 (3977469)	4
79 (21980735)	3
81 (21439848)	3
76 (26366400)	4
80 (22347342)	4

Surgery	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	1	5	2	5	0	0

References	Study Quality
76 (26366400)	4
82 (22361063)	4

Variant 6: Patient with a 3 week history of pneumonia, fever, dyspnea. Worsening condition despite a full course of broad-spectrum antibiotics. CT scan shows a loculated pleural collection with overlying pleural thickening (empyema). Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Another course of antibiotics and postural drainage	Usually not appropriate	Strong	N/A	N/A	2	2	1	9	1	0	1	0	1	0	0

References	Study Quality
84 (28840000)	Good

		86 (22459772)		Good												
Needle aspiration	Usually not appropriate	Strong	N/A	N/A	3	3	2	3	4	2	0	1	1	0	0
		References		Study Quality												
		84 (28840000)		Good												
		86 (22459772)		Good												
Open decortication	May be appropriate	Moderate	N/A	N/A	6	6	0	0	0	3	2	6	1	1	0
		References		Study Quality												
		84 (28840000)		Good												
		87 (30370082)		4												
Percutaneous catheter drainage with administration of thrombolytic therapy	Usually appropriate	Moderate	N/A	N/A	8	8	0	0	0	0	1	1	4	3	4
		References		Study Quality												
		36 (18309017)		3												
		84 (28840000)		Good												
		85 (28274565)		4												
Video-assisted thoracic surgery decortication	Usually appropriate	Moderate	N/A	N/A	7	7	0	0	0	0	0	4	6	2	1
		References		Study Quality												
		84 (28840000)		Good												
		87 (30370082)		4												

Variant 7: Woman of childbearing age with abdominal pain, fever, and leukocytosis. Marked tenderness on pelvic examination. CT scan shows a walled-off, probable tubo-ovarian abscess (TOA) greater than 3 cm. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Conservative management only	May be appropriate	Limited	N/A	N/A	5	5	0	0	5	2	6	1	0	0	0

		References			Study Quality											
		100 (23539877)			2											
		99 (26848871)			4											
Endoscopic US-guided drainage	May be appropriate	Limited	N/A	N/A	5	5	0	0	0	1	7	6	0	0	0
		References			Study Quality											
		105 (20659232)			4											
		104 (28918808)			4											
Surgical/laparoscopic drainage	May be appropriate	Strong	N/A	N/A	5	5	0	0	0	0	11	3	0	0	0
		References			Study Quality											
		103 (19393776)			2											
		101 (21419651)			2											
		102 (-3148231)			4											
Transabdominal needle aspiration	May be appropriate	Expert Consensus	N/A	N/A	6	6	0	0	0	0	2	10	2	0	0
Transabdominal percutaneous catheter drainage	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	0	3	10	1
		References			Study Quality											
		90 (12881584)			2											
		91 (12099560)			4											
		92 (10871453)			4											
		93 (9646800)			3											
		95 (15516608)			4											
		89 (15665222)			3											
		88 (27106643)			4											
		94 (26591964)			4											
Transgluteal needle aspiration	May be appropriate	Expert Consensus	N/A	N/A	6	6	0	0	0	0	2	10	2	0	0

Transgluteal percutaneous catheter drainage	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	1	2	10	1

References	Study Quality
90 (12881584)	2
91 (12099560)	4
92 (10871453)	4
93 (9646800)	3
95 (15516608)	4
89 (15665222)	3
88 (27106643)	4
94 (26591964)	4

Transrectal needle aspiration	May be appropriate	Expert Consensus	N/A	N/A	6	6	0	0	0	0	2	10	2	0	0
Transrectal percutaneous catheter drainage	Usually appropriate	Limited	N/A	N/A	7	7	0	0	0	0	0	2	10	2	0

References	Study Quality
90 (12881584)	2
91 (12099560)	4
92 (10871453)	4
93 (9646800)	3
95 (15516608)	4
89 (15665222)	3
98 (15219951)	4
88 (27106643)	4
94 (26591964)	4

Transvaginal needle aspiration	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	0	2	10	2	0	0

References	Study Quality
99 (26848871)	4

Transvaginal percutaneous catheter drainage	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	0	1	8	5	0

References	Study Quality
90 (12881584)	2
91 (12099560)	4
92 (10871453)	4
93 (9646800)	3
95 (15516608)	4
89 (15665222)	3
97 (19772677)	4
96 (22579130)	2
88 (27106643)	4
94 (26591964)	4

Variant 8: Patient with recent endoscopic retrograde cholangiopancreatography and sphincterotomy now with 3 weeks of worsening right upper quadrant pain, fever, jaundice, and malaise. CT scan reveals 2 liver abscesses greater than 3 cm. MRCP demonstrates no biliary obstruction or stones. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Continued conservative management	May be appropriate	Limited	N/A	N/A	4	4	0	2	5	0	5	2	0	0	0

References	Study Quality
114 (12567615)	4
115 (1863218)	4
108 (27350946)	4

Needle aspiration	May be appropriate	Limited	N/A	N/A	6	6	0	0	1	0	4	3	4	1	0

References	Study Quality
114 (12567615)	4
115 (1863218)	4
108 (27350946)	4
116 (27047771)	4
117 (15708321)	4

		118 (24046781)		4												
Percutaneous catheter drainage only	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	1	1	1	3	5	2
		References		Study Quality												
		106 (21195630)		4												
		107 (22578643)		4												
		108 (27350946)		4												
		109 (17715080)		1												
		110 (18306874)		3												
Percutaneous catheter drainage with conversion to percutaneous biliary drain	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	0	4	5	1	2	1
		References		Study Quality												
		111 (21879281)		3												
		112 (16528651)		3												
		113 (11918890)		2												
Surgical management	May be appropriate	Limited	N/A	N/A	5	5	0	1	1	1	4	5	0	1	0
		References		Study Quality												
		108 (27350946)		4												
		116 (27047771)		4												
		110 (18306874)		3												
		119 (22536008)		3												
		120 (21472130)		4												
		121 (15729072)		3												

Variant 9: Patient presents to the emergency department with 5 days of progressive ankle swelling and 2 days of fever. An ultrasound was obtained given the diffuse soft-tissue swelling around the ankle which revealed a subperiosteal abscess. Treatment includes antibiotics.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Continued conservative management	Usually not appropriate	Expert Consensus	N/A	N/A	2	2	1	7	3	0	0	1	0	1	0
Needle aspiration	May be appropriate	Limited	N/A	N/A	5	5	0	0	0	2	11	1	0	0	0
References				Study Quality											
126 (27280623)				4											
127 (15895789)				4											
Percutaneous catheter drainage only	May be appropriate	Limited	N/A	N/A	5	5	0	0	0	5	7	1	1	0	0
References				Study Quality											
122 (8929301)				4											
Surgical drainage	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	1	1	1	7	3
References				Study Quality											
123 (24446020)				4											
124 (26323185)				4											
125 (28405074)				4											

Appendix Key

A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

Appropriateness Category: The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

SOE: Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- **Study Quality**: The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

RRL: Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

Rating: The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Median: The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Final tabulations: A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at **www.acr.org/ac.**