American College of Radiology
ACR Appropriateness Criteria®

Radiologic Management of Gastric Varices

Variant 1: Cirrhotic patient with active bleeding from large high flow gastric varices, significant portal hypertension,and a MELD score of 14. CT demonstrates a large gastrorenal shunt.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
BRTO	Usually appropriate	Strong	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
26 (11287510)	2
47 (11959725)	2
18 (15269027)	2
51 (15788621)	2
52 (21353984)	4
56 (19032446)	1
15 (12845306)	1
16 (28246514)	2
20 (24468043)	2
23 (11029085)	4
24 (11283531)	4
25 (15362757)	4
27 (10228513)	4
28 (16714879)	4
29 (16361051)	1
30 (17635469)	4
31 (8661570)	4

32 (16261433)	4
33 (15802443)	4
34 (22942551)	4
35 (18029851)	4
36 (20594229)	2
37 (10086645)	4
38 (12859723)	4
39 (27234486)	2
40 (12853666)	4
41 (26957907)	2
42 (20737152)	4
43 (26316136)	4
44 (23481167)	2
45 (26295655)	2
46 (23323252)	4
48 (28483304)	4
49 (22733913)	2
50 (28180928)	4
53 (18713295)	4
54 (16804972)	2
55 (18647931)	4
57 (10067311)	4
58 (8911204)	4
59 (9473542)	4
60 (25519690)	Good
62 (14695698)	4
63 (20172743)	4
64 (15688111)	2
65 (24322305)	2
66 (23939627)	2
61 (19470572)	4

TIPS	Usually appropriate	Strong	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
18 (15269027)	2
11 (26517576)	1
12 (24480619)	1
13 (10534333)	4
14 (9558287)	2
15 (12845306)	1
16 (28246514)	2
17 (17661241)	1
19 (10902977)	4
20 (24468043)	2
21 (27106732)	2
22 (27458505)	1
10 (26614596)	4

Endoscopic management	Usually appropriate	Strong	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
6 (15057756)	4
2 (27786365)	4
7 (9260698)	2
8 (26469912)	Good
9 (17380280)	3

Partial splenic embolization	May be appropriate	Strong	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0

References	Study Quality
71 (16534680)	1
55 (18647931)	4
67 (18019732)	3
68 (28494001)	4

		69 (25311969)		2											
		70 (22459878)		3											
Surgical management	May be appropriate	Strong	N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		74 (16697728)		1											
		72 (1735356)		4											
		73 (25957003)		1											
		75 (28381381)		2											
		76 (24960036)		4											
		77 (16481287)		4											

Variant 2: Cirrhotic patient with bleeding from large high flow gastric varices with a MELD score of 20. CT demonstrates a large gastrorenal shunt.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
BRTO	Usually appropriate	Limited	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		80 (23681780)		2											
Endoscopic management	Usually appropriate	Strong	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		26 (11287510)		2											
		36 (20594229)		2											
		39 (27234486)		2											
TIPS	May be appropriate	Limited	N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		33 (15802443)		4											

		79 (29404473)		2											
		78 (24148622)		4											
Partial splenic embolization	May be appropriate	Limited	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		68 (28494001)		4											
		69 (25311969)		2											
Surgical management	May be appropriate	Strong	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		26 (11287510)		2											
		36 (20594229)		2											
		39 (27234486)		2											

Variant 3: Cirrhotic patient bleeding from small, low flow gastric varices and moderate ascites with a MELD score of 18. MRI does not demonstrate a gastrorenal shunt.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Endoscopic management	Usually appropriate	Limited	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		6 (15057756)		4											
TIPS	Usually appropriate	Limited	N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		81 (28121521)		2											
Partial splenic embolization	May be appropriate	Limited	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		66 (23939627)		2											

		82 (21618687)		4											
Surgical management	May be appropriate	Strong	N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		26 (11287510)		2											
		36 (20594229)		2											
		39 (27234486)		2											
BRTO	Usually not appropriate	Limited	N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		80 (23681780)		2											

Variant 4: Cirrhotic patient bleeding from large, high flow gastric varices with hepatic encephalopathy and a MELD score of 18. MRI demonstrates a large gastrorenal shunt.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
BRTO	Usually appropriate	Strong	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		26 (11287510)		2											
		60 (25519690)		Good											
		80 (23681780)		2											
Endoscopic management	Usually appropriate	Limited	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		26 (11287510)		2											
Partial splenic embolization	May be appropriate	Strong	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		66 (23939627)		2											

		84 (15654779)		2												
TIPS	May be appropriate	Limited	N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		83 (14730033)		4												
Surgical management	May be appropriate	Limited	N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		83 (14730033)		4												

Variant 5: Cirrhotic patient bleeding from esophageal varices and gastric varices not amenable to endoscopic management with a MELD score of 13 and a hepatic wedge pressure of 22 mmHg. CT demonstrates a small gastrorenal shunt.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
TIPS	Usually appropriate	Strong	N/A	N/A	9	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		18 (15269027)		2											
		11 (26517576)		1											
		13 (10534333)		4											
		14 (9558287)		2											
		15 (12845306)		1											
		16 (28246514)		2											
		17 (17661241)		1											
		19 (10902977)		4											
		20 (24468043)		2											
Surgical management	May be appropriate	Strong	N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											

		73 (25957003)		1											
		75 (28381381)		2											
Partial splenic embolization	May be appropriate	Limited	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		67 (18019732)		3											
BRTO	Usually not appropriate	Strong	N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		26 (11287510)		2											
		47 (11959725)		2											
		51 (15788621)		2											
		24 (11283531)		4											
		27 (10228513)		4											
		30 (17635469)		4											
		35 (18029851)		4											
		37 (10086645)		4											
		38 (12859723)		4											
		53 (18713295)		4											
		55 (18647931)		4											
		62 (14695698)		4											
		63 (20172743)		4											
		85 (18528292)		2											

Variant 6: Cirrhotic patient bleeding from large high flow gastric varices with a MELD score of 12 and a hepatic wedge pressure of 10 mmHg. MRI demonstrates a large gastrorenal shunt.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
BRTO	Usually appropriate	Limited	N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0

		References		Study Quality												
		60 (25519690)		Good												
TIPS	Usually appropriate	Limited	N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		86 (3391371)		2												
Endoscopic management	Usually appropriate	Limited	N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		9 (17380280)		3												
Partial splenic embolization	May be appropriate	Limited	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		67 (18019732)		3												
		68 (28494001)		4												
Surgical management	May be appropriate	Limited	N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
		References		Study Quality												
		67 (18019732)		3												
		68 (28494001)		4												
		87 (15127277)		3												

Variant 7: Patient with gastric variceal bleeding, found to have chronic splenic vein occlusion on MRI.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Surgical management	Usually appropriate	Limited	N/A	N/A	8	8	0	0	1	0	3	0	1	4	2
		References		Study Quality											
		89 (24500452)		4											

		95 (10773149)		4												
		96 (8424698)		2												
Splenic vein recanalization	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	1	1	2	5	2
		References		Study Quality												
		93 (23636249)		4												
Partial splenic embolization	Usually appropriate	Limited	N/A	N/A	7	7	0	0	0	0	1	2	5	3	0
		References		Study Quality												
		89 (24500452)		4												
		94 (26304614)		4												
Endoscopic management (sclerosis or cyanoacrylate injection)	May be appropriate	Limited	N/A	N/A	5	5	0	1	1	3	2	3	0	1	0
		References		Study Quality												
		89 (24500452)		4												
		90 (18498359)		4												
BRTO	Usually not appropriate	Limited	N/A	N/A	3	3	2	2	4	3	0	0	0	0	0
		References		Study Quality												
		89 (24500452)		4												
		91 (21479742)		4												
		92 (23830671)		4												
TIPS	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	1	2	3	3	1	0	1	0	0

Variant 8: Patient with chronic intrahepatic and extrahepatic portal vein occlusion with cavernous transformation on CT with gastric variceal bleeding.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Portal vein recanalization plus	Usually	Strong	N/A	N/A	8	8	0	0	0	0	0	1	3	5	2

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
TIPS	appropriate														
	References	Study Quality													
	98 (26997089)	4													
	102 (16517786)	4													
	103 (19417681)	4													
	106 (29113006)	2													
	105 (22147244)	2													
	99 (29600476)	2													
	104 (30503174)	2													
	101 (19953883)	2													
	100 (25759969)	1													
Endoscopic management (sclerosis or cyanoacrylate injection)	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	1	4	1	1	3	1
	References	Study Quality													
	1 (28663672)	2													
Partial splenic embolization	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	1	1	6	3	0	0
	References	Study Quality													
	108 (26192300)	4													
	109 (28643575)	4													
	110 (15175899)	4													
Surgical management	May be appropriate	Expert Consensus	N/A	N/A	6	6	0	0	1	0	2	4	3	1	0
BRTO	Usually not appropriate	Limited	N/A	N/A	2	2	0	8	2	0	0	0	0	0	0
	References	Study Quality													
	107 (24497799)	4													

92 (23830671)	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.**