

Supplementary Table 1 Quality assessment using modified Newcastle Ottawa Scale for cohort studies

Studies	Case definition	selection			Comparability	Outcomes			Quality score
		Representativeness	Selection of Controls	Definition of Controls	Groups match and adjustment	Assessment of outcomes	follow-up	Loss to follow-up	
Cho et al.	1	1	0	1	2	1	1	1	8
Eguchi et al.	1	1	0	1	1	1	1	1	7
Hirokawa et al.	1	1	0	1	2	1	1	1	8
Hokuto et al.	1	1	0	1	2	1	1	1	8
Ishii et al.	1	1	0	1	2	1	1	1	8

Jung et al.	1	1	0	1	2	1	1	1	8
Kaibori et al.	1	1	0	1	2	1	1	1	7
Kim et al.	1	1	0	1	1	1	1	1	7
Kudo et al.	1	1	0	1	1	1	1	1	7
Okamura et al.	1	1	0	1	2	1	1	1	8
Shin et al.	1	1	0	1	1	1	1	1	7
Shindoh et al.	1	1	0	1	1	1	1	1	7
Yamamoto et al	1	1	0	1	1	1	1	1	7

Zhao et al.	1	1	0	1	2	1	1	1	8
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Supplementary Table 2 Patient's Characteristics between AR and NAR group

Study	Year	Country	Group	Patients	Age	Male	HBsAg	HCV-Ab	Cirrhosis%	Child-A/B	AFP	DCP	ICG R15%	Tumor size(cm)	MVI%
Shindoh et al	2020	Japan	AR	38	65 (32-82)	28(73.7)	20(53)	29(76.3)	32.0	/	6 (3-79)	/	/	2.3 (0.8-4.1)	37
			NAR	165	67 (39-87)	116(70.3)	43(26)	57(34.5)	51.0	/	9 (4-37)	/	/	1.8 (0.2-5.0)	19
Jung et al	2019	Korea	AR	936	56.7±9.7	746(79.7)	794(84.8)	51(54.5)	49.3	/	897.1 ± 3 732.1	38 (24-158)	13.2±5.9	3.3±0.9	19.8
			NAR	388	57.7±10.1	310(79.9)	314(80.9)	35(90.2)	63.0	/	752.3 ± 3 415.1	30 (23-66)	16.1±7.8	3.1±0.8	17.5
Cho et al	2019	Korea	AR	59	54.9 ± 11.5	43(72.9)	48 (81.2)	4 (6.8)	/	/	334.8 ± 1 134.0	/	10.7 ± 5.4	2.6 ± 1.2	44.1
			NAR	59	54.9±10.7	45(76.3)	49 (83.1)	4 (6.8)	/	/	268.9 ± 580.4	/	10.2 ± 4.9	2.6± 1.8	45.8
Shin et al	2018	Korea	AR	53	56.74±10.09	40(75.5)	37 (69.8)	8 (15.1)	/	53/0	9.2 (1.7-6 540)	29 (13, 1043)	14.15 ± 5.39	2.36±0.47	15.1
			NAR	63	56.16±10.48	52(82.5)	44 (69.8)	4 (6.3)	/	63/0	12.06 (1.3-1 725.5)	30 (11, 1127)	16.15 ± 9.62	2.21±0.47	14.3
Hokuto et al	2018	Japan	AR	20	73 (31-82)	16(80.0)	4 (20.0)	5 (25.0)	20.0	/	5.7 (2.7-3 083)	46 (4-45 660)	14.3 (6.4-78.1)	2.4 (1.0-4.0)	45
			NAR	20	74 (49-84)	15(75.5)	2 (10.0)	4 (20.0)	30.0	/	6.9 (1.4-1 634)	50 (2-36 700)	12.8 (4.6-29.0)	2.5 (1.1-5.0)	45
Zhao et al	2017	China	AR	114	55(29-82)	93(81.6)	88(77.2)	/	65.8	112/2	67.1(1.2-136 000.0)	/	5.0(0.5-19.5)	5.0(1.5-20.0)	39.5

			NAR	114	57(30-81)	94(82.5)	88(77.2)	/	66.7	113/1	100(0.7-350 000.0)	/	5.6(1.3-30.1)	5.0(1.0-15.0)	41.2
Kaibori et al	2017	Japan	AR	355	65 (28-85)	274(77.2)	124(34.9)	149(42)	34.6	353/2	12 (0-15 940)	/	9.2 (0.9-15)	2.9 (0.7-6.5)	23.4
			NAR	355	64 (27-86)	272(76.6)	132(37.2)	141(39.7)	38.6	350/5	11 (1-35 490)	/	9.6 (0-15)	3.0 (0.9-5.5)	23.4
Kim et al	2016	Korea	AR	27	51 (24-78)	21(77.8)	24 (88.9)	0 (0)	/	/	25.4 (2.0-7 213.4)	/	7.3 (4.2-14.6)	3.5 (1.4-4.8)	55.6
			NAR	72	50 (28-70)	56(77.8)	61 (84.7)	8 (11.1)	/	/	52.4 (1.4-221 619.7)		9.4 (4.2-14.8)	2.7 (1.0-5.0)	23.6
Hirokawa et al	2015	Japan	AR	72	69 (32-84)	52(72.2)	11 (15)	47 (65)	36.0	67/5	14 (2-10 776)	165	13 (2-30)	3.0 (0.5-5.0)	/
			NAR	72	67 (30-86)	58(80.6)	11 (15)	48 (67)	35.0	66/6	13 (1-239 599)	223	13 (5-35)	3.0 (1.0-5.0)	/
Okamura et al	2014	Japan	AR	64	71 (44-83)	55(85.9)	14(21.9)	29(45.3)	32.8	63/1	8.7 (1.6-82 587)	/	16 (5-32)	3 (0.7-16)	7.8
			NAR	64	67 (39-83)	51(79.7)	14(21.9)	34(53.1)	57.8	64/0	11.8 (2.1-24 982)	/	17 (7-37)	2.5 (1.0-16)	17.2
Kudo et al	2014	Japan	AR	121	67.3±9.5	95(78.5)	20 (17)	64 (53)	44.0	/	583 ± 4 118	/	15.7±10.1	3.3±1.1	/
			NAR	112	66.9±10.6	73(65.2)	21 (19)	65 (58)	61.0	/	125 ± 377	/	21.1±13.9	2.6±1.1	/
Ishii et al	2014	Japan	AR	44	64.9 ± 10.2	38(86.4)	19(43.2)	18(40.9)	45.5	44/0	11.7 (6.5-38.4)	27.55 (4-1448)	10.4 ± 5.6	3 (2.5-3.5)	22.7
			NAR	44	64.5 ± 9.5	38(86.4)	24(54.5)	12(27.3)	56.8	44/0	14.5 (5.8-46.4)	25.96 (4- 405)	13.5 ± 8.8	3 (2.3-3.5)	29.5

Eguchi et al	2008	Japan	AR	2 267	62.7±9.23	1 764(77.81)	/	/	/	/	/	/	/	/
			NAR	3 514	63.4±9.02	2 619(74.53)	/	/	/	/	/	/	/	/
Yamamoto et al	2001	Japan	AR	90	/	/	/	/	38.9	/	/	/	/	21.1
			NAR	114	/	/	/	/	59.6	/	/	/	/	18.4

Parenthesis indicates percentage unless indicated;

AR = Anatomical resection; NAR = Non-anatomical resection; HBsAg = hepatitis B surface antigen; HCV-Ab = hepatitis C virus anti-body. Child-A/B = Child-Pugh A or B;

AFP= Alpha fetoprotein, DCP = Des-γ-carboxy prothrombin, ICGR-15 = Indocyanine green retention rate at 15 minutes; “/” = not available.

Supplementary Table 3 Perioperative and Long-term Results Between anatomical and Non-anatomical Resection Group

Study	Year	Country	Group	Patients	Operation	Blood loss	blood	surgical	Duration of	follow-up	1-year	1-year	5-year	5-year	
					time(min)		transfusion	margin	complications	hospital	time(m)	OS	DFS	OS	DFS
								(mm)		stay(d)					
Shindoh et al	2020	Japan	AR	38	176 (145–201)	314 (169–582)	0(0)	8.8 ± 8.5	4 (11)	/	64	/	/	92	72.3
			NAR	165	121 (94–151)	114 (7–263)	2 (1)	4.9 ± 4.6	14 (8)	/	58.8	/	/	77.2	45
Jung et al	2019	China	AR	936	/	/	/	/	/	/	61(1-135)	/	/	83.2	/
			NAR	388	/	/	/	/	/	/	61(1-136)	/	/	79.7	/
Cho et al	2019	Korea	AR	59	262.1 ± 91.7	311.7± 40.6	2 (3.4)	1.4± 1.0	/	/	55.5±26.4	94.8	84.4	92.9	68.4
			NAR	59	262.9 ± 113.0	272.4± 35.5	4 (6.8)	1.5± 1.0	/	/	62.3±29.5	100	87.7	90.1	73.5
Shin et al	2018	Korea	AR	53	/	/	/	/	/	/	66.7(6.4-143.3)	100	75	81	43
			NAR	63	/	/	/	/	/	/	66.7(6.4-143.4)	98	90	86	51
Hokuto et al	2018	Japan	AR	20	285 (132–478)	580 (70–4 860)	2 (10.0)	6 (0–30)	2(10)	/	/	100	100	92	69

			NAR	20	188 (139–300)	360 (10–2 010)	2 (10.0)	4 (1–40)	5(25)	/	/	100	90	82	33
Zhao et al	2017	China	AR	114	245(90-510)	400(50-5000)	85(74.6)	6(0-40)	/	/	48(1-142)	90.4	84.1	65.7	45.1
			NAR	114	190 (75-450)	375 (50-3000)	88(77.2)	5(0-50)	/	/	48(1-142)	88.6	75.4	52.2	31
Kaibori et al	2017	Japan	AR	355	255 (50–797)	430 (0–5 100)	39(11.0)	/	78(22.0)	/	67.7	96.6	82.7	80.6	47.9
			NAR	355	257 (83–730)	400 (0–3 425)	38(10.7)	/	68(19.2)	/	66.1	96.3	76.1	70.5	41.4
Kim et al	2016	Korea	AR	27	302 (180–492)	500 (200–2 400)	2 (7.4)	1.1 (0.1–6.8)	4(14.8)	9 (7–72)	96(7,139)	96.3	74.1	77	58.2
			NAR	72	212 (110–360)	400(50–2 00)	1 (1.4)	1.0 (0.1–3.5)	4(5.6)	9 (7–27)	93(6,143)	97.2	84.7	88.7	48.2
Hirokawa et al	2015	Japan	AR	72	308 (75–628)	715 (50–5 100)	22 (31)	/	17 (24)	19 (10–104)	/	99	78	79	35
			NAR	72	222 (110–465)	373 (10–2 110)	9 (13)	/	7 (10)	16 (9–54)	/	99	83	84	41
Okamura et al	2014	Japan	AR	64	271 (133–575)	551 (76–3 225)	0	0.7 (0–4.2)	/	11 (7–35)	/	98.3	80.8	71	50

											0.7 (0–					
											2.5)		79.7		31.9	
			NAR	64	229 (83–619)	465 (12–2 569)	0	/	/	11 (5–57)	/	96.4	69.7			
Kudo et al	2014	Japan	AR	121	/	/	/	/	/	/	/	93	80	69	46	
			NAR	112	/	/	/	/	/	/	/	94	69	63	23	
Ishii et al	2014	Japan	AR	44	340.1± 105.8	400 (310 - 482)	/	/	/	/	/	95.4	78.9	74.6	27.2	
			NAR	44	322.7 ± 96.8	355 (270 - 560)	/	/	/	/	/	90.9	67.5	51.1	30	
Eguchi et al	2008	Japan	AR	2 267	/	/	/	/	/	/	/	/	/	65.5	39.8	
			NAR	3 514	/	/	/	/	/	/	/	/	/	62.4	34.4	
Yamamoto et al	2001	Japan	AR	90	/	/	/	/	/	/	/	/	/	67	/	
			NAR	114	/	/	/	/	/	/	/	/	/	55.8	/	

Parenthesis indicates percentage unless indicated ;

AR=anatomical resection; NAR= non-anatomical resection; OS= Overall survival; DFS= Disease-free survival; “/” = not available.