Mesohepatectomy Versus Extended Hemihepatectomies for Centrally Located Liver Tumors: A Meta-Analysis

Running title: Mesohepatectomy for Centrally Located Liver Tumors

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Supplementary table 1. Extracted data and pooled values of preoperative variables for the 20 included studies

Ref. Year	Type of Operation	Blood Vessel Invasion (%)	Cirrhosis (%)	Preoperative TACE/TACI(%)	Virus Infection (%)	Total Bilirubin (Mean/Median, umol/l)	Albumin (Mean/Median,g/l)	ALT/AST (Mean/Median, U/L)	PLT (Mean/Median, 10^9/l)	PT (Mean/Median, s)	Child-Pugh Grade (%)	ICG-R15 (Mean/Median) (%)	AFP (Mean/Median, ng/ml)	Number of Tumours (Solitary %)	Formation of Tumor Capsule (%)	Tumor Size (Mean/Median, cm) (Range, cm)
Zuo, 2014[3]	MH	NA	100 (24/24)	NA	95.8 (23/24, HBV 19 HCV 2 Both 2)	NA	NA	NA	NA	NA	A: 87.5 (21/24) B: 12.5 (3/24)	NA	NA	NA	41.7 (10/24)	6.3 2.0-14.0
Mehrabi, 2008[14]	MH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chouillard, 2003[20]	MH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lee, 2008[19]	MH	NA	100 (27/27)	59.3 (16/27)	85.2 (23/27, HBV 20 HCV 3)	NA	NA	NA	NA	NA	A: 100 (27/27)	9.7	11	NA	NA	4.3 2.0-9·0
Giuliante, 2008[16]	MH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.2 3.0-12.0

Chen, 2006[12]	MH	NA	100 (58/58)	8.6 (5/58)	98.3 (57/58, HBV 51 HCV 6)	17.1	42.0	ALT 40.5 AST 22.5	178.5	NA	A: 90.9 (50/55) B: 9.1 (5/55)	NA	1135	82.8 (48/58)	NA	10.4 5.6-19.5
			100 (60/60)	6.6 (4/60)	96.7 (58/60, HBV 54 HCV 4)	17.1	41.0	ALT 41.1 AST 40.5	188.3		A: 95.0 (57/60) B: 5.0 (3/60)		1300	80.0 (48/60)		11.5 5.3-21.2
Arkadopoulos, 2012[17]	MH	NA	NA	NA	NA	NA	NA	NA	NA	NA	A: 100 (16/16) A: 100 (20/20)	NA	NA	NA	NA	4 2.0-6.0 3.5 2.5-5.0
Chen, 2008[13]	MH	NA	84.0 (215/256)	23.0 (59 /256)	14.1 (36/256, HBV 36)	NA	NA	NA	NA	NA	A: 93.0 (238/256) B: 7.0 (18 /256)	NA	4200	84.4 (216 /256)	NA	7.2 NA
Chen, 2007[10]	MH	44.9 (40/89)	83.1 (74/89)	NA	84.3 (75/89, HBV 75)	12.1	38.0	NA	NA	NA	A: 87.6 (78/89) B: 12.4 (11/89)	NA	2838	86.5 (77 /89)	60.7 (54/89)	10.3 NA
		42.7 (67/157)	84.1 (132/157)		83.4 (131/157, HBV131)	11.8	39.0				A: 90.4 (142/157) B: 9.6 (15/157)		2335	83.4 (131/157)	56.1 (88/157)	9.9 NA

Dai, 2008[15]	MH	NA	NA	NA	100 (17/17, most for HBV)	NA	NA	NA	NA	NA	A: 100 (17/17)	NA	NA	NA	NA	12.4 4.0-21.0
Miao, 2009[21]	MH	NA	NA	NA	100 (47/47, most for HBV)	NA	NA	NA	NA	NA	A: 100 (47/47)	NA	NA	NA	NA	11.2 4.0-23.0
Hasegawa, 1989[18]	MH	NA	NA	NA	NA	NA	31.7	AST 49.9	NA	NA	NA	19.9	NA	NA	NA	9.5 3.0-17.0
Gallagher, 2013[11]	MH	61.9 (13/21)	100 (21/21)	NA	85.7 (18/21, HBV 16 HCV 2)	13.0	43.0	AST 47.0	194.0	NA	A: 100 (21/21)	9.9	NA	90.5 (19/21)	NA	7.0 2.3-11.0
Wu, 1999[8]	MH	66.7 (10/15)	73.3 (11/15)	20.0 (3/15)	100 (15/15, HBV 13 HCV 2)	NA	NA	NA	NA	NA	A: 93.3 (14/15) B: 6.7 (1/15)	NA	NA	73.3 (11/15)	26.7 (4/15)	12.8 8.5-18.0
	EH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Scudamore, 2000[9]	MH	NA	16.7 (3/18)	NA	27.8 (5/18, HBV 5)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	EH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Qiu, 2013[1]	MH	NA	72.3 (211/292)	NA	73.3 (217/292, HBV 214 HCV 3)	14.2	42.9	ALT 51.1	146.5	11.5	A: 94.5 (276/292) B: 5.5 (16/292)	6.4	NA	82.2 (240/292)	NA	6.9 NA
	EH	NA	61.6 (85/138)	NA	68·8 (95/138, HBV 95)	15.5	40.8	ALT 45·7	155.5	11.4	A: 90.6 (125/138) B: 9.4 (13/138)	6.2	NA	76.1 (105/138)	NA	7.2
Chen, 2014[6]	MH	25.4 (30/118)	89.8 (106/118)	8.5 (10/118)	97.5 (115/118, HBV 100 HCV 15)	NA	NA	NA	NA	NA	A: 100 (118/118)	5.3	NA	NA	NA	8.6 2.5-13.6
	EH	29.8 (14/47)	85.1 (40/47)	17.0 (8/47)	97.9 (46/47, HBV 41 HCV 5)	NA	NA	NA	NA	NA	A: 100 (47/47)	5.2	NA	NA	NA	8.4
		30.3 (10/33)	84.8 (28/33)	12.1 (4/33)	100 (33/33, HBV 28 HCV 5)						A: 100 (33/33)	4.9				8.2
Yang, 2014[7]	MH	53.2 (84/158)	81.0 (128/158)	NA	90.5 (143/158, HBV143)	23.3	41.1	ALT 58.3	165.5	11.5	A: 83.5 (132/158) B: 16.5 (26/158)	NA	NA	48.7 (77 /158)	53.8 (85/158)	7.5 NA

		57.8 (111/192)	79.7 (153/192)		89.6 (172/192, HBV172)	21.6	42.1	ALT 51.9	171.8	11.3	A: 86.5 (166/192) B: 13.5 (26/192)			43.8 (84/192)	55.7 (107/192)	3.2 NA
	EH	56.1 (194/346)	78.6 (272/346)	NA	87.6 (303/346, HBV303)	21.5	40.1	ALT 53.1	176.4	11.6	A: 82.1 (284/346) B: 17.9 (62/346)	NA	NA	40.8 (141/346)	47.1 (163/346)	8.1
Hu, 2003[4]	MH	23.1 (12/52)	46.2 (24/52)	NA	46.2 (24/52, HCV 24)	NA	NA	NA	NA	NA	NA	17.4	NA	90.4 (47/52)	75.0 (39/52)	NA
	EH	42.6 (26/61)	38.1 (24/63)	NA	20.6 (13/63, HCV 13)	NA	NA	NA	NA	NA	NA	12.4	NA	79.4 (50/63)	52.4 (33/63)	NA
	MH	47.6 (30/63)	47.6 (30/63)	11.1 (7/63)	92.1 (58/63, HBV 43 HCV 15)	13.7	40.5	ALT 41.0 AST 38.00	198.0	11.8	A: 88.9 (56/63) B: 11.1 (7/63)	8.6	58	NA	71.4 (45/63)	7.2 NA
Cheng, 2012[5]	EH	46.3 (19/41)	36.6 (15/41)	7.3 (3/41)	85.4 (35/41, HBV 27 HCV 8)	13.7	42.0	ALT 49.0 AST 49.0	179.5	11.9	A: 90.2 (37/41) B: 7.3 (3/41)	8.1	82	NA	63.4 (26/41)	8.5

Polled value	MH	44.1	79.5	17.7	85.5 HBV73.1 HCV11.7	15.9	39.7	ALT 47.0 AST 38.5	173.9	11.6	A:92.4 B:7.6	11.4	1991.9	80.6	58.2	8.6
	95% CI	33.4-55.3	70.3-86.4	9.0-31.9	71.0-93.5 HBV 55.0-85.8 HCV 5.0-24.9	12.4-19.4	37.7-41.6	ALT 38.0-56.0 AST 29.7-47.3	158.2-189.7	11.2-11.9	A:89.2-94.7 B:5.3-10.8	5.7-17.0	654.6-3329.2	66.6-89.6	49.1-66.7	7.3-10.0
	EH	44.0	62.4	12.2	78.7 HBV78.9 HCV17.2	17.0	40.8	ALT 50.1 AST -	170.8	11.7	A:89.5 B:10.5	7.9	-	66.6	52.0	8.2
	95% CI	31.6-57.2	42.9-78.5	6.3-22.2	51.2-92.9 HBV 64.7-88.4 HCV 12.4-23.5	11.8-22.1	39.5-42.0	ALT 45.4-54.9 AST -	156.9-184.6	11.4-11.9	A:80.2-94.7 B:5.3-19.8	4.0-11.9	-	36.9-87.2	43.3-60.6	7.8-8.5

MH=mesohepatectomy; EH=hemi- or extended- hemihepatectomies; 95% CI=95% confidence interval; NA=not available; TACE=transarterial chemoembolization; TACI=transarterial chemoinfusion; ALT=alanine aminotransferase; AST=aspartate aminotransferase; PLT=platelet; PT=prothrombin time; ICG-R15=indocyanine green retention rate at 15 min; AFP=alpha-fetoprotein; HBV=hepatitis B virus; HCV= hepatitis C virus.

Supplementary table 2. Extracted data and pooled values of intraoperative variables for the 20 included studies

Ref. Year	Type of Operation	Segments of Resection (number of patients)	Operation time(Mean/ Median,min) (Range, min)	Occlusion Time(Mean/ Median,min)(Range, min)	Transection Time(Mean, min)	Blood Loss (Mean/Median,ml)(Range, ml)	Rate of Transfusion Required (%)	Volume of Transfusion (Mean/Median,ml)(Range, ml)	Weight of Resected Liver(Mean/ Median, g) (Range, g)	Section Margin (Mean/Median, cm) or (≥1cm%)or(R0%)
Zuo, 2014[3]	MH	IV, V and VIII: 9 IVb,V and VIII: 8 IVa, V and VIII: 4 I, IV, V and VIII: 3	238 NA	23.0 15.0-60.0	NA	480 200-2200	NA	NA	NA	NA
Mehrabi, 2008[14]	MH	IV, V and VIII: 48	238 65-480	NA	NA	1120 100-5000	66.7 (32/48)	738 200-2400	NA	NA
Chouillard, 2003[20]	MH	IV, V and VIII: 16	280 180-420	NA	NA	NA	NA	NA	NA	NA
Lee, 2008[19]	MH	IV, V and VIII: 27	330 215-669	NA	NA	1400 550-7000	NA	345 0-3200	300 147-483	1.5*
Giuliante, 2008[16]	MH	IV, V and VIII: 18	448 240-792	60.0 16.0-125.0	NA	NA	27.8 (5/18)	400 200-800	NA	0.6*
Chen, 2006[12]	MH	V and VIII: 8 IV, V and VIII: 49 V and VIII: 7 IV, V and VIII: 53	124.5 88–243 133 95-271	13.5 7.0-28.0 12.6 6.0-30.0	NA	770 230-3800 420 130-980	46.6 (27/58) 13.3 (8/60)	NA	761 430-2150 816 550-2360	NA

Arkadopoulos, 2012[17]	MH	I, IV, V and VIII: 36	180 120-230 150 115-190	46.0 36.0-61.0 28.0 22.0-45.0	NA	650 300-1100 400 200-700	NA	440 0-800 240 0-1000	NA	NA
Chen, 2008[13]	MH	IV, V and VIII: 248 I, IV, V and VIII: 8	174 NA	10.8 NA	NA	510 NA	20.3 (52/256)	NA	230 NA	57.8†
Chen, 2007[10]	MH	IV, V and VIII: 82 I, IV, V and VIII: 7 IV, V and VIII: 141 I, IV, V and VIII: 16	177 NA 115 NA	15.2 NA 11.3 NA	21.0 16.0	790 NA 420 NA	44.9 (40/89) 24.8 (39/157)	NA	NA	19.1† 16.6†
Dai, 2008[15]	MH	IV, V and VIII: 17	245 190-330	NA	NA	NA	17.6 (3/17)	NA 300-1500	NA	41.2†
Miao, 2009[21]	MH	IV, V and VIII: 47	211 125-330	50.0 11.0-107.0	NA	580 180-4500	29.8 (14/47)	NA 300-4000	NA	27.7†
Hasegawa, 1989[18]	MH	IV, V and VIII: 13 IV, V, VIII ,VII+part of II and III: 1 V, VIII+part of IV: 2	NA 300-660	NA	NA	2850 600-7500	NA	NA	NA 370-1440	NA
Gallagher, 2013[11]	MH	IV, V and VIII: 21	627 240-1149	NA	NA	1590 120-3750	57.1 (12/21)	NA	NA	0.5* 100§
Wu, 1999[8]	MH	IV, V and VIII: 15	474 342-660	131.0 68.4-184.4	NA	2450 720-5350	66.7 (10/15)	1100 0-3000	859 290-1750	0.5*
	EH	extended right lobectomy: 14 extended left lobectomy: 11	348 270-630	58.4 36-108.5	NA	1863 520-4360	72.0 (18/25)	768 0-3000	NA	NA
Scudamore, 2000[9]	MH	IV, V, VIII±I: 18	238 115-435	45.0 19.0-74.0	NA	914 NA	44.4 (8/18)	NA	560 NA	NA

Qiu, 2013[1]	EH	extended right lobectomy: 32 extended left lobectomy: 11	304 NA	39.0 NA	NA	1628 NA	NA	NA	1500 NA	NA
	MH	V, IVb+part of IVa and VIII: 88 IVa, VIII+part of V and IVb: 56 Irregular resection: 59 IV, V and VIII± I: 19 IV, V and VIII ± I: 70	259 NA	NA	NA	634 NA	33.9 (99 /292)	820 NA	NA	NA
Chen, 2014[6]	EH	extended hemihepatectomy: 138	211 NA	NA	NA	570 NA	24.6 (34/138)	750 NA	NA	NA
	MH	IV, V and VIII±I: 118	244 100-450	30.3 0.0-90.0	NA	NA	34.7 (41/118)	456 0-2400	NA	66.9†
Yang, 2014[7]	EH	extended right lobectomy: 47	225 165-370	28.7 5-60	NA	NA	36.2 (17/47)	532 0-3200	NA	83.0†
		extended left lobectomy: 33	219 162-290	25.4 0-35			30.3 (10/33)	493 0-2600		83.0†
	MH	IV, V, and VIII: 350	NA	17.9 NA	15.2	951 NA	37.3 (59/158)	NA	NA	52.5†
				16.3 NA	14.2	903 NA	31.8 (61/192)			64.1†
Hu, 2003[4]	EH	hemihepatectomy or less: 346	NA	15.8 NA	13.9	855 NA	26.3 (91/346)	NA	NA	61.6†
	MH	(IV, V and VIII) or (V and VIII): 52	265 NA	NA	NA	NA	NA	1030 NA	NA	57.7†
	EH	Hemihepatectomy or extended: 63	264 NA	NA	NA	NA	NA	440 NA	NA	74.6†

Cheng, 2012[5]	MH	I, IV, V and VIII: 63	230 NA	NA	NA	500 NA	12.7 (8/63)	600 NA	227 NA	7.4†
	EH	Hemihepatectomy or extended: 41	316 NA	NA	NA	750 NA	NA	600 NA	590 NA	21.1†
	MH	Resection of Segment I%: 5.1	245	29.5	16.3	720	34.0	726	526	40.1†
	95% CI	Resection of Segment I%:2.1-12.1	219-272	26.2-32.8	13.2-19.3	578-861	28.1-40.5	527-925	179-872	26.0-56.1†
Polled value	EH	Hemihepatectomy%:38.4 Extended:61.6 Left extended%:36.9 Right extended%:63.1	274	35.0	-	`1001	35.1	592	1029	62.3†
	95% CI	Hemihepatectomy%:1.1-97.2 Extended%:2.8-98.9 Left extended%:26.7-48.4 Right extended%:51.6-73.3	236-313	17.3-52.7	-	743-1260	23.7-48.5	474-709	138-1920	40.3-80.1†

MH=mesohepatectomy; EH=hemi- or extended- hemihepatectomies; 95% CI=95% confidence interval; NA=not available; R0=tumor-free margins; *=mean or median section margin; †=section margin ≥1cm%; §=R0%.

Supplementary table 3. Extracted data and pooled values of postoperative variables for the 20 included studies

Ref. Year	Type of Operation	Differentiation(Edmondson-Steiner grade) (%)	Overall Morbidity(%)	Recurrence(%)	Reoperation(%)	Rate of Liver Failure (%)	Mortality (%)	Causes for Mortalityand number of patients	Length of Postoperative Stay(Mean/Median,d)(Range, d)*	Median OS(m) and Median DFS(m)*	1-year OS and DFS (%)*	3-year OS and DFS (%)*	5-year OS and DFS (%)*	6-year OS and DFS (%)*
Zuo, 2014[3]	MH	NA	33.3 (8/24)	NA	NA	NA	NA	NA	NA	NA	76.0 NA	46.0 NA	NA	NA
Mehrabi, 2008[14]	MH	NA	27.1 (13/48)	NA	NA	2.1 (1/48)	2.1 (1/48)	liver failure:1	15.8 (6-104)	NA	NA	NA 47.9	NA	NA
Chouillard, 2003[20]	MH	NA	18.8 (3/16)	NA	NA	NA	0.0 (0/16)	-	NA	NA	NA	NA	NA	NA
Lee, 2008[19]	MH	NA	44.4 (12/27)	29.6 (8/27)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Giuliante, 2008[16]	MH	NA	33.3 (6/18)	22.2 (4/18)	NA	NA	0.0 (0/18)	-	18.0	NA	NA	NA	NA	NA
Chen, 2006[12]	MH	NA	29.3 (17/58) 31.7 (19/60)	NA	NA	3.4 (2/58) 3.3 (2/60)	1.7 (1/58) 0.0 (0/60)	liver failure:1 -	NA	NA	NA	NA	NA	NA

Arkadopoulos, 2012[17]	MH	NA	37.5 (6/16)	NA	NA	NA	0.0 (0/16)	-	NA	NA	NA	NA	NA	NA
			45 (9/20)				0.0 (0/20)							
Chen, 2008[13]	MH	NA	28.1 (72/256)	82.8 (212/256)	NA	NA	0.4% (1/256)	NA	NA	36.9 16.0	77.0 59.1	49.8 28.8	35.1 17.0	NA
Chen, 2007[10]	MH	NA	34.8 (31/89)	79.8 (71/89)	0.0 (0/89)	2.2 (2/89)	3.4 (3/89)	liver failure:2 sepsis:1	NA	57.0 36.0	87.1 75.0	62.9 46.2	46.2 31.8	NA
			24.2 (38/157)	86.6 (136/157)	0.0 (0/157)	0.6 (1/157)	0.6 (1/157)	liver failure:1	NA	41.0 28.0	82.2 69.6	54.4 38.0	31.7 16.5	NA
Dai, 2008[15]	MH	NA	47.1 (8/17)	NA	NA	0.0 (0/17)	0.0 (0/17)	-	NA	NA	NA	NA	NA	NA
Miao, 2009[21]	MH	NA	34.0 (16/47)	NA	NA	0.0 (0/47)	0.0 (0/47)	-	NA	NA	NA	NA	41.0 NA	NA
Hasegawa, 1989[18]	MH	NA	37.5 (6/16)	68.8 (11/16)	6.3 (1/16)	6.3 (1/16)	6.3 (1/16)	liver failure:1	NA	34.0 NA	81.3 NA	43.8 NA	37.5 NA	25.0 NA
Gallagher, 2013[11]	MH	NA	42.9 (9/21)	33.3 (7/21)	23.8 (5/21)	4.8 (1/21)	4.8 (1/21)	multiorgan failure:1	NA	32.3 15.5	90.5 65.0	66.8 34.8	66.8 34.8	NA
Wu, 1999[8]	MH	NA	20.0 (3/15)	93.3 (14/15)	NA	0.0 (0/15)	0.0 (0/15)	-	NA	33 15.0	67.0 53.0	44.0 31.0	30.0 20.0	30.0 21.0
	EH	NA	36.0 (9/25)	NA	NA	8.0 (2/25)	4.0 (1/25)	liver failure:1	NA	NA	NA 38.0	NA 19.0	NA	NA 9.0
Scudamore, 2000[9]	MH	NA	61.1 (11/18)	NA	NA	NA	0.0 (0/18)	-	9.0	NA	NA	NA	NA	NA

	EH	NA	74.4 (32/43)	NA	NA	NA	0.0 (0/43)	-	16.0	NA	NA	NA	NA	NA
Qiu, 2013[1]	MH	NA	19.9 (58/292)	NA	0.7 (2/292)	NA	0.7 (2/292)	uncontrollable bleeding: 1 sepsis: 1	NA	NA	NA	NA	NA	NA
	EH	NA	52.2 (72/138)	NA	0.0 (0/138)	NA	1.4 (2/138)	liver failure:1	NA	NA	NA	NA	NA	NA
Chen, 2014[6]	MH	I: 24.6(29/118) II: 56.8(67/118) III: 18.6(22/118)	37.3 (44/118)	NA	NA	1.7 (2/118)	2.5 (3/118)	liverfailure: 2 severe pulmonary infection: 1	17.7 (7-66)	30.0 15.3	67.8 53.4	45.5 30.5	28.9 16.9	NA
	EH	I: 36.2(17/47) II: 46.8(22/47) III: 17.0(8/47) I: 33.3(11/33) II: 45.5(15/33) III: 21.2(7/33)	55.3 (26/47) 24.2 (8/33)	NA	NA	10.6 (5/47) 6.1 (2/33)	8.5 (4/47) 3.0 (1/33)	liver failure: 3 postoperative bleeding: 1 liver failure:1	17.2 (11-53) 15.6 (10-24)	30.0 22.7	73.8 61.2	44.5 37.5	30.3 27.4	NA
Yang, 2014[7]	MH	I+II: 54.4(86/158) III+IV: 45.6(72/158) NA	13.9 (22/158) 11.5 (22/192)	69.6 (110/158) 61.5 (118/192)	NA	NA	0.0 (0/158) 0.0 (0/192)	-	NA	33.0 21.0 37.0 21.0	79.0 58.0 80.0 68.0	47.0 37.0 52.0 37.0	30.0 26.0 31.0 25.0	NA
	EH	NA	11.3 (39/346)	64.7 (224/346)	NA	NA	0.6 (2/346)	liver failure:2	NA	40.5 24.0	84.0 65.0	55.0 37.0	32.0 23.0	NA
Hu, 2003[4]	MH	I+II: 65.4(34/52) III+IV: 34.6(18/52)	17.3 (9/52)	61.5 (32/52)	5.8 (3/52)	NA	0.0 (0/52)	-	NA	51.0 23.0	89.0 63.0	75.0 29.0	70.0 23.0	NA

Cheng, 2012[5]	EH	I+II: 46.0(29/63) III+IV: 54.0(34/63)	19.0 (12/63)	54.0 (34/63)	12.7 (8/63)	3.2 (2/63)	3.2 (2/63)	liver failure:2	NA	47.0 25.0	94.0 74.0	75.0 44.0	59.0 42.0	NA
	MH	I+II: 39.7(25/63) III+IV: 60.3(38/63)	12.7 (8/63)	61.9 (39/63)	6.3 (4/63)	3.2 (2/63)	7.9 (5/63)	multiorgan failure:5	10.0	42.0 9.8	87.5 50.0	57.0 27.0	53.1 15.0	NA
	EH	I+II: 34.1(14/41) III+IV: 65.9(27/41)	14.6 (6/41)	41.5 (17/41)	NA	4.9 (2/41)	7.3 (3/41)	multiorgan failure:3	11.2	35.0 11.2	89.5 50.0	51.0 38.9	66.2 38.9	NA
Polled value	MH	I+II:61.4 III+IV:38.6	29.2	62.6	3.9	2.5	2.0	52.2‡	13.5	38.2 16.4	80.8 60.1	54.0 33.2	42.5 19.7	27.3 -
	95% CI	I+II:42.9-77.1 III+IV:22.9-57.1	24.1-34.8	49.6-74.0	1.1-12.7	1.5-4.0	1.2-3.3	28.6-75.0‡	8.7-18.2	34.0-42.8 12.6-21.3	76.1-85.4 55.0-65.3	47.8-60.2 29.1-37.4	33.9-51.1 16.2-23.1	11.6-42.9 -
	EH	I+II:55.5 III+IV:44.5	32.9	55.0	2.9	6.7	2.8	71.8‡	14.2	37.7 19.8	85.8 60.1	56.6 36.3	46.0 31.3	-
	95% CI	I+II:26.8-80.9 III+IV:19.1-73.2	17.0-54.0	41.4-67.9	0.1-51.6	3.9-11.2	1.3-5.9	44.5-89.0‡	9.7-18.7	30.4-46.7 16.7-23.4	78.3-93.2 51.0-69.2	44.9-68.3 30.3-42.4	29.7-62.2 22.0-40.6	-

MH=mesohepatectomy; EH=hemi- or extended- hemihepatectomies; 95% CI=95% confidence interval; NA=not available; OS=overall survival; DFS=disease free survival;

*=the value of upper line and lower line for OS and DFS respectively; ‡=liver failure%

Supplementary table 4. Indications Reported for MH and EH

Type of Indication	MH		EH		
	Number reported (*n*=1782)	**Frequency (%)**	**Number reported (*n*=736)**	**Frequency (%)**	***p***
Primary malignant diseases	1701	95.5	704	95.7	0.828
Hepatocellular carcinoma	1683	94.4	687	93.3	0.285
Cholangiocarcinoma	9	0.5	10	1.4	0.024
Gallbladder carcinoma	7	0.4	7	1	0.087
Hepatosarcoma	2	0.1	-	-	-
Metastases	66	3.7	28	3.8	0.904
Colorectal	40	2.2	22	3	0.273
Pancreas	3	0.2	-	-	-
Kidney	2	0.1	-	-	-
Others	9	0.5	-	-	-
Not Specified	12	0.7	6	0.8	0.701
Benign diseases	15	0.8	4	0.5	0.252
Focal nodular hyperplasia	10	0.6	3	0.4	0.625
Hemangioma	2	0.1	-	-	-
Gastrointestinal stromal tumor	1	0.1	-	-	-
Others	2	0.1	-	-	-
Not Specified	-	-	1	0.1	-

MH=mesohepatectomy; EH=hemi- or extended- hemihepatectomies

Supplementary table 5. Postoperative Complications Reported for MH and EH

Type of complication	MH		EH		*p*
	Number reported (*n*=481)	Frequency (%)	Number reported (*n*=178)	Frequency (%)	
Surgical complications	113	23.5	47	26.4	0.439
Bilioma/bile leakage	65	13.5	12	6.7	0.016
Wound infection	33	6.9	28	15.7	0
Abdomen abscess	14	2.9	6	3.4	0.76
Others	1	0.2	1	0.6	0.47
Medical complications	368	76.5	131	73.6	0.439
Pleural effusion	166	34.5	29	16.3	0
Ascites	87	18.1	32	18.0	0.974
Pulmonary infection	33	6.9	14	7.9	0.656
Delayed jaundice	14	2.9	28	15.7	0
Liver failure	14	2.9	13	7.3	0.012
Haemorrhage/Stress ulcer bleeding	13	2.7	6	3.4	0.646
Others	41	8.5	9	5.1	0.184

Supplementary table 6. Postoperative Tumor Recurrence Reported for MH and EH

Type of Recurrence	MH		EH		*P*
	Number reported (*n*=742)	Frequency (%)	Number reported (*n*=250)	Frequency (%)	
Intrahepatic recurrence	585	78.8	194	77.6	0.679
Single lesion	70	9.4	4	1.6	-
Multiple lesion	153	20.6	9	3.6	-
Not Specified	362	48.8	181	72.4	-
Extrahepatic recurrence	157	21.2	56	22.4	0.679
Lung metastasis	47	6.3	-	-	-
Other organs metastasis	42	5.7	-	-	-
Not Specified	68	9.2	56	22.4	-

MH=mesohepatectomy; EH=hemi- or extended- hemihepatectomies

Supplementary table 7. Methods of hepatic blood occlusion Reported for MH

Type of Occlusion Method	Feature	Intermittent%	Number reported (*n*=1585)	Frequency (%)
Occlusion of hepatic blood inflow /Pringle maneuver [1, 3, 5, 7-9, 12, 14-16, 18, 23]	Clamping of the hepatic pedicle	97.9	985	62.1
Hemihepatic vascular occlusion /selective inflow blood occlusion [5-9, 13, 17, 20-23]	Clamping of the ipsilateral hepatic artery and portal vein	96.3	354	22.3
Hepatic vascular exclusion (HVE) [3]	Sequential clamping of portal triad and the inferior vena cava(IVC) both above and below the liver	100	3	0.2
Modified technique of hepatic vascular exclusion (MTHVE) [14, 15]	Sequential clamping of portal triad and the IVC below the liver	100	201	12.7
Extraparenchymal control of hepatic veins/Selective hepatic vascular exclusion (SHVE) [18, 19]	Sequential clamping of hepatic pedicle, right hepatic vein (RHV), the left hepatic vein (LHV) and the middle hepaticvein (MHV)	100	22	1.4
Sequential hemihepatic vascular control (SHHVC) [19]	Sequential clamping of left portal pedicle, left and middle hepatic veins→left transection→Outflow and inflow restored→the same process on the right	-	20	1.3

Supplementary table 8. Terminology of MH

Year	First author	Terms	title of article
1961	Pack	middle hepatic lobectomy	Middle hepatic lobectomy for cancer [28]
1972	McBride	central hepatectomy	Cancer of the right lobe of the liver: a variety of operative procedures [34]
1977	Foster	middle lobectomy	Solid liver tumors [29]
1987	Lin TY	middle hepatectomy	Role of surgery in the treatment of primary carcinoma of the liver: A 31-year experience [30]
1989	Hasegawa	central bisegmentectomy	Central bisegmentectomy of the liver: experience in 16 patients [20]
1998	Billingsley	Central hepatectomy/mesohepatectomy	Segment-oriented hepatic resection in the management of malignant neoplasms of the liver[31]
1999	Wu C C	Mesohepatectomy	Mesohepatectomy for centrally located hepatocellular carcinoma: an appraisal of a rare procedure [8]
2002	La Quaglia MP	Central hepatic resection	Central hepatic resection for pediatric tumors [32]
2008	Lee JG	central bisectionectomy	Central bisectionectomy for centrally located hepatocellular carcinoma [21]

Supplementary forest plots [posted as supplied by author]

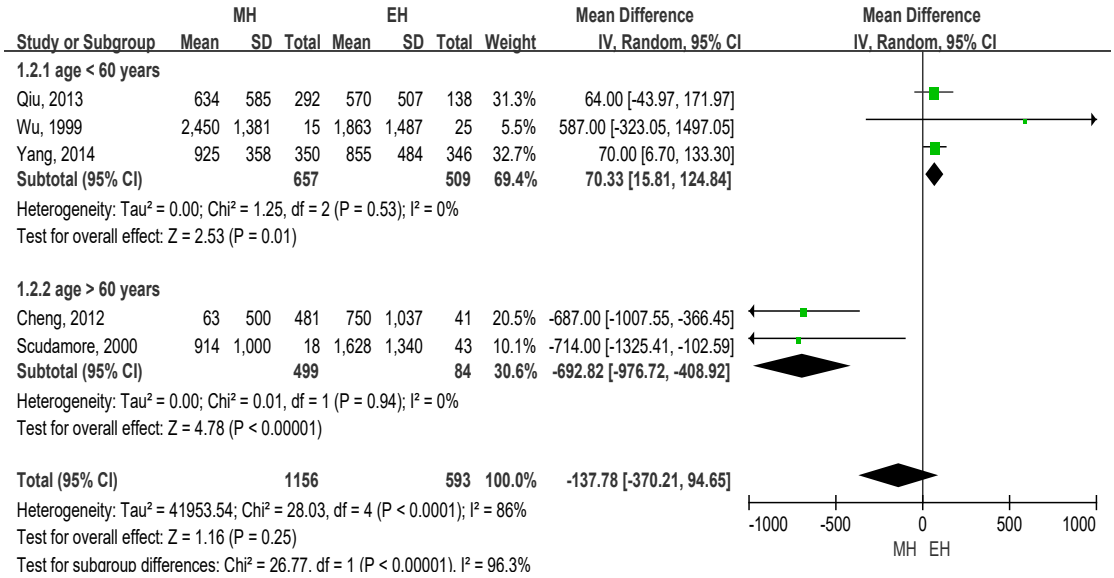


Fig A Subgroup analysis of blood loss by mean age of patients

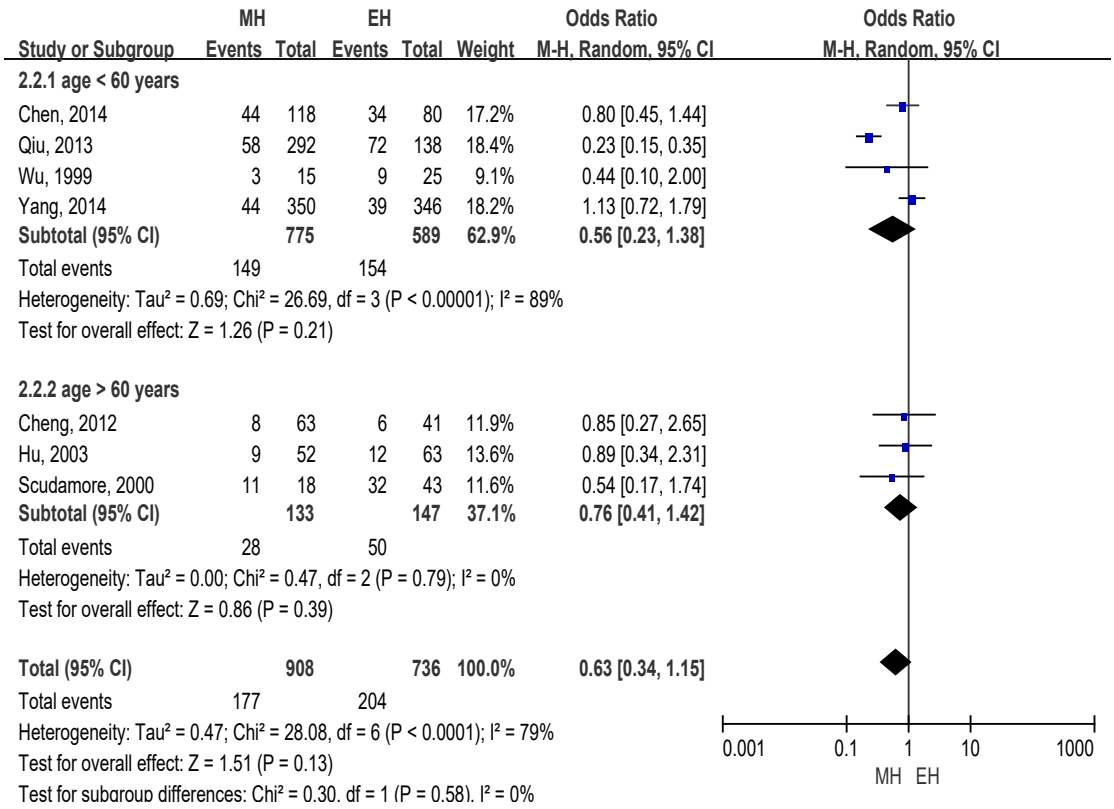


Fig B1 Subgroup analysis of morbidity rate by mean age of patients (the study Hu,2003 grouped to age>60years)(because study Hu,2003 failed to provide the age data)

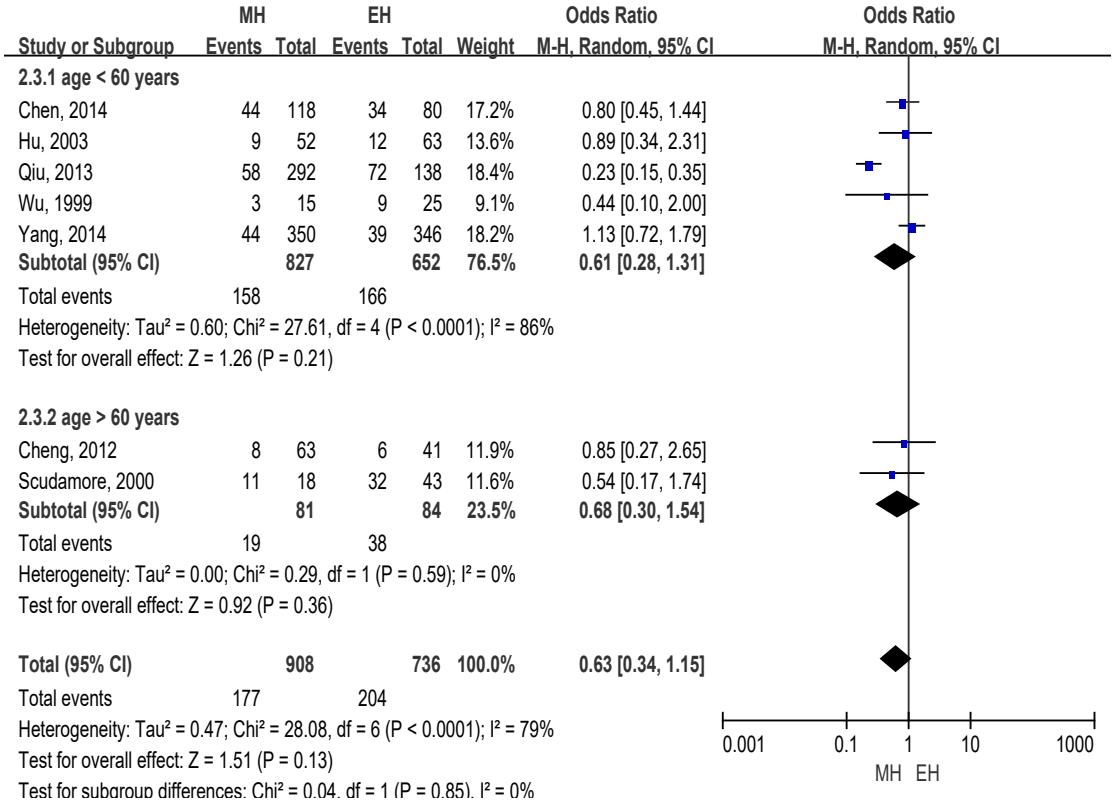


Fig B2 Subgroup analysis of morbidity rate by mean age of patients (the study Hu,2003 grouped to age<60years)

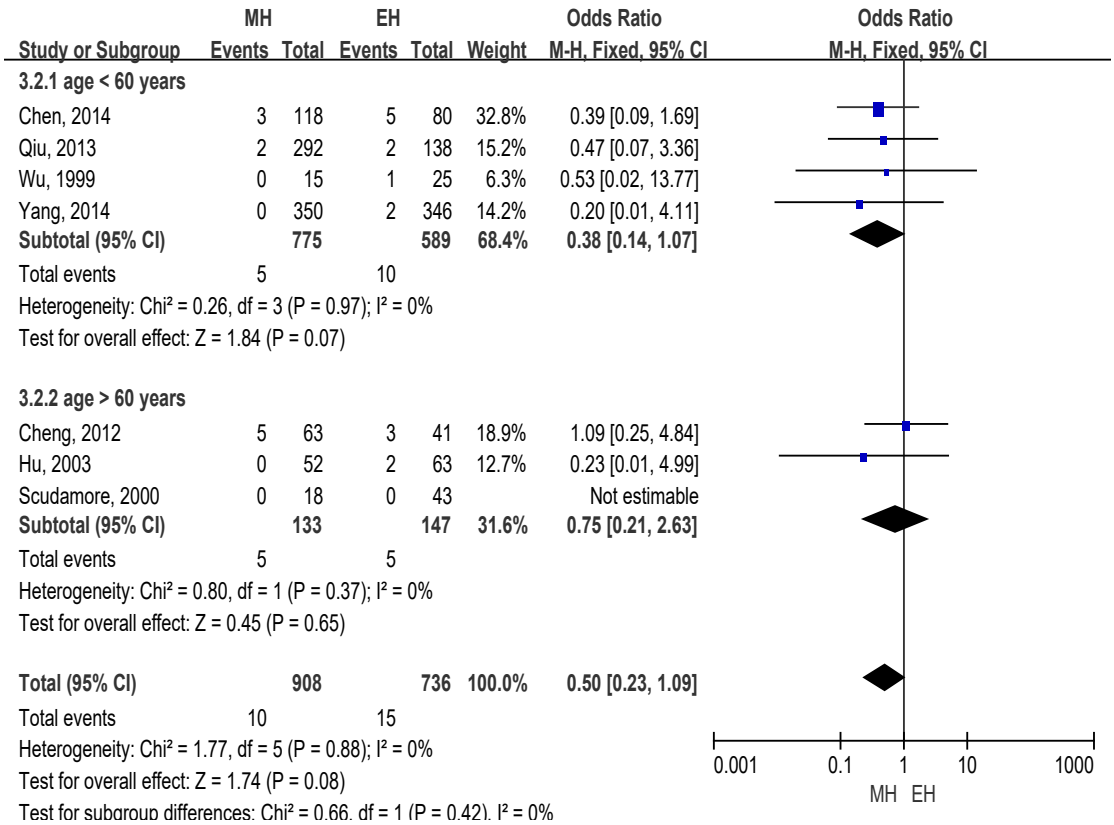
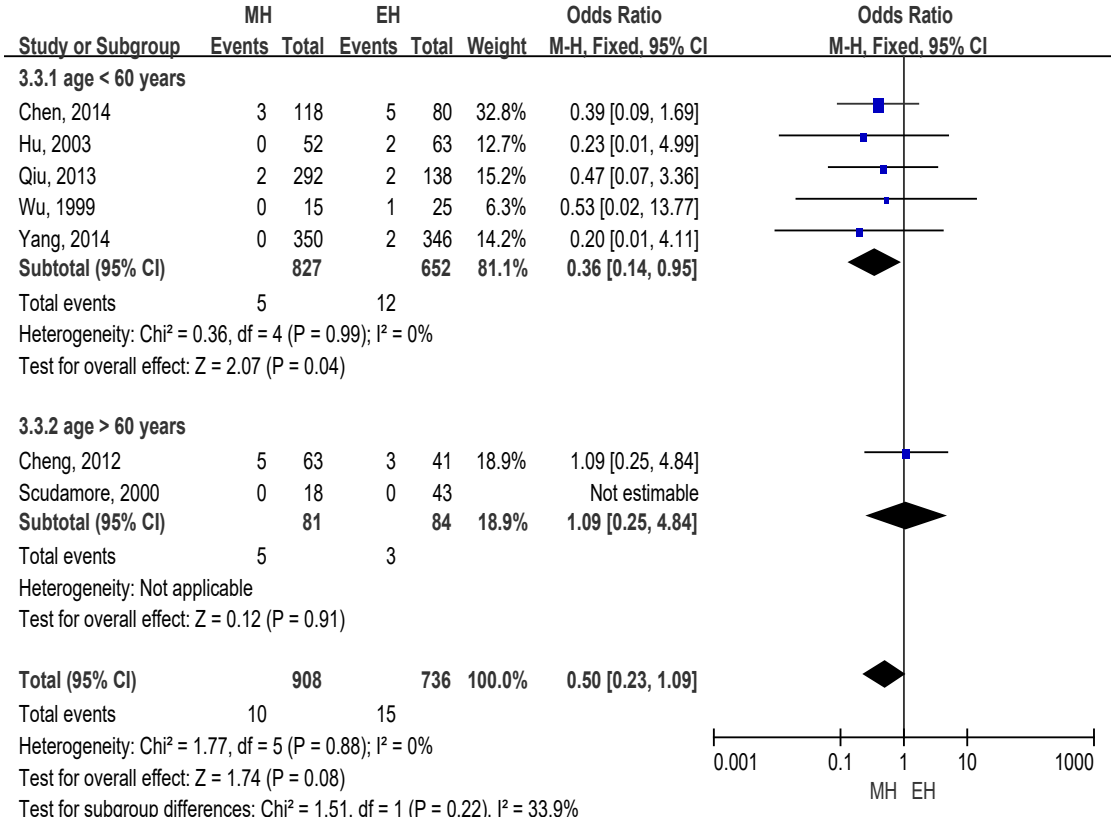


Fig C1 Subgroup analysis of mortality rate by mean age of patients (the study Hu,2003 grouped to age>60years)



FigC2 Subgroup analysis of mortality rate by mean age of patients (the study Hu,2003 grouped to age<60years)

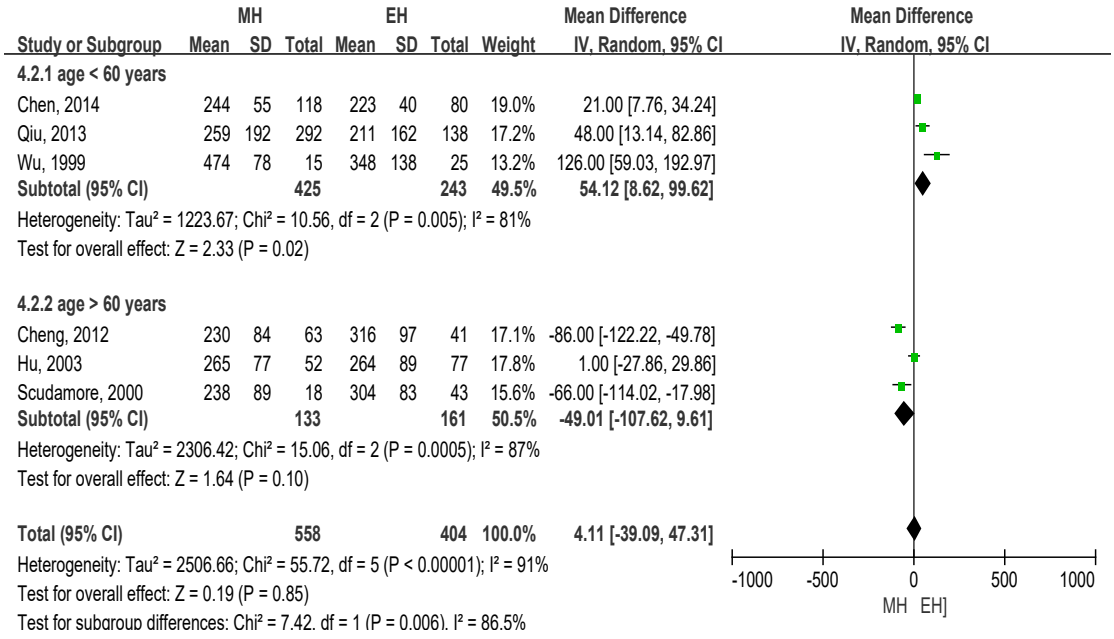
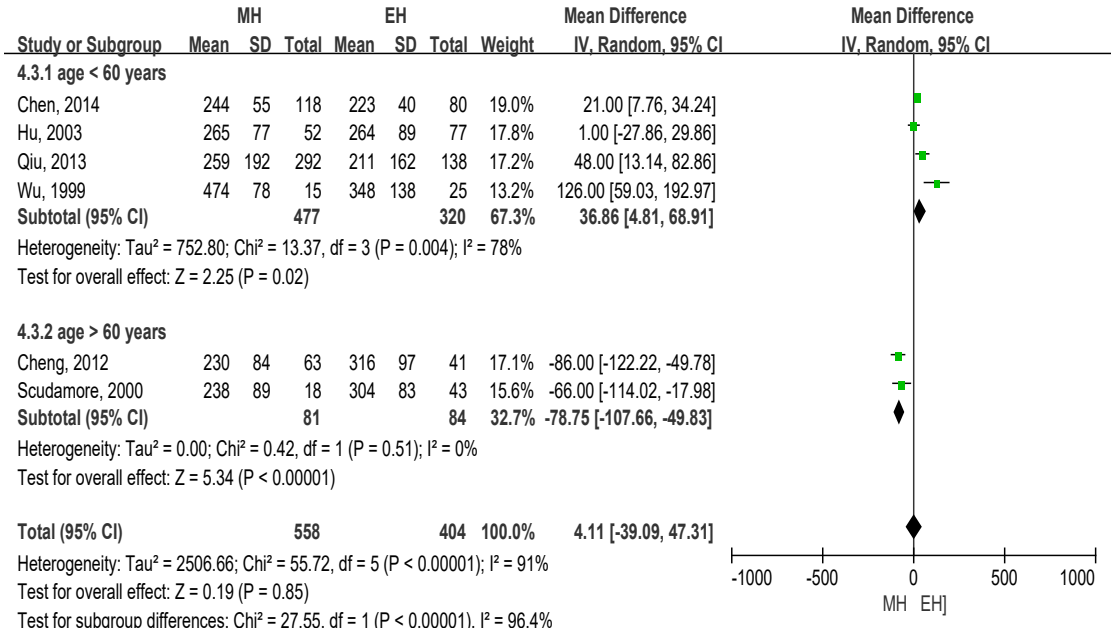


Fig D1 Subgroup analysis of operation time by mean age of patients (the study Hu,2003 grouped to age>60years)



FigD2 Subgroup analysis of operation time by mean age of patients (the study Hu,2003 grouped to age<60years)

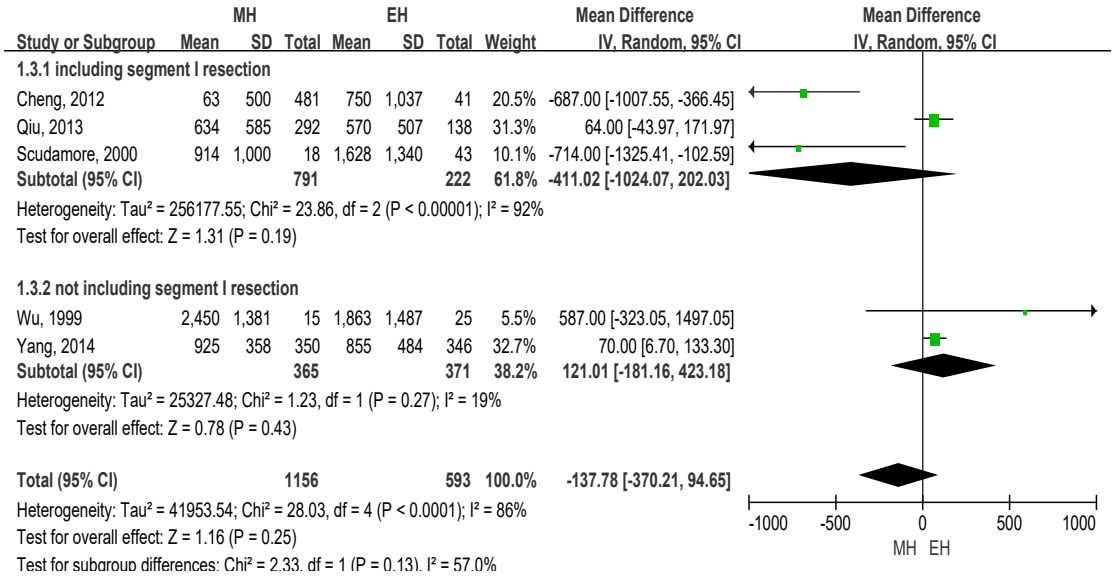


Fig E Subgroup analysis of blood loss by type of MH

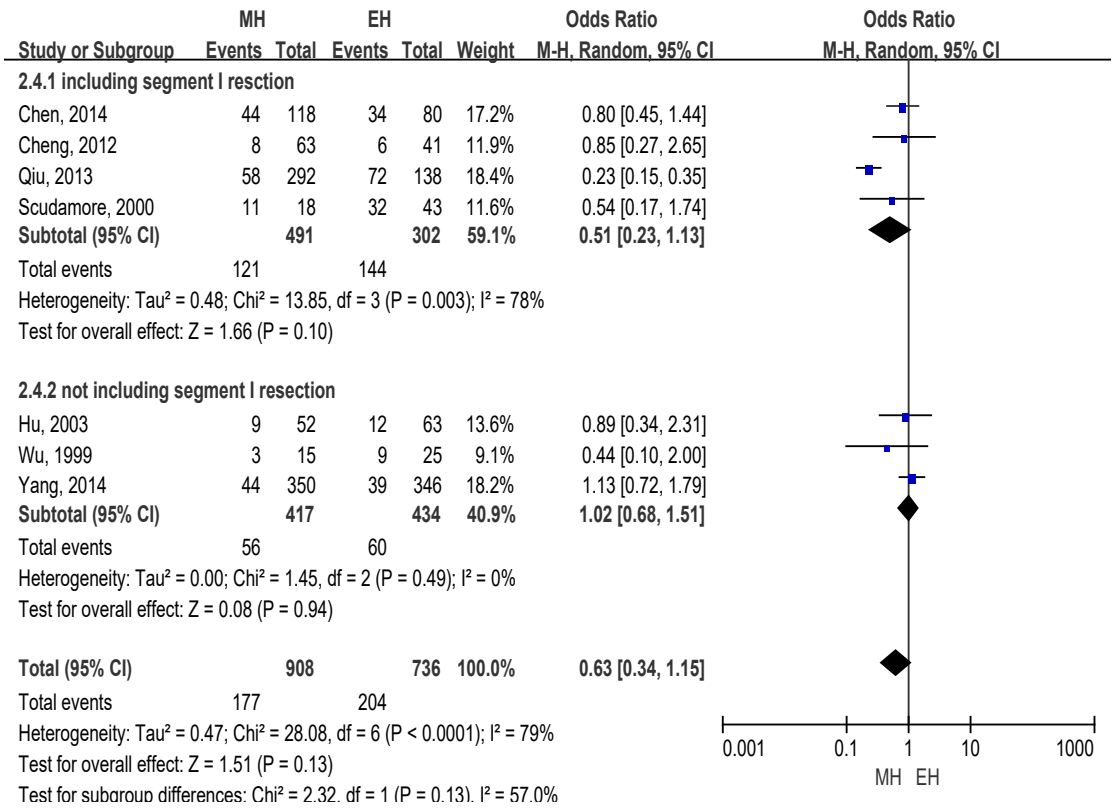


Fig F Subgroup analysis of morbidity rate by type of MH

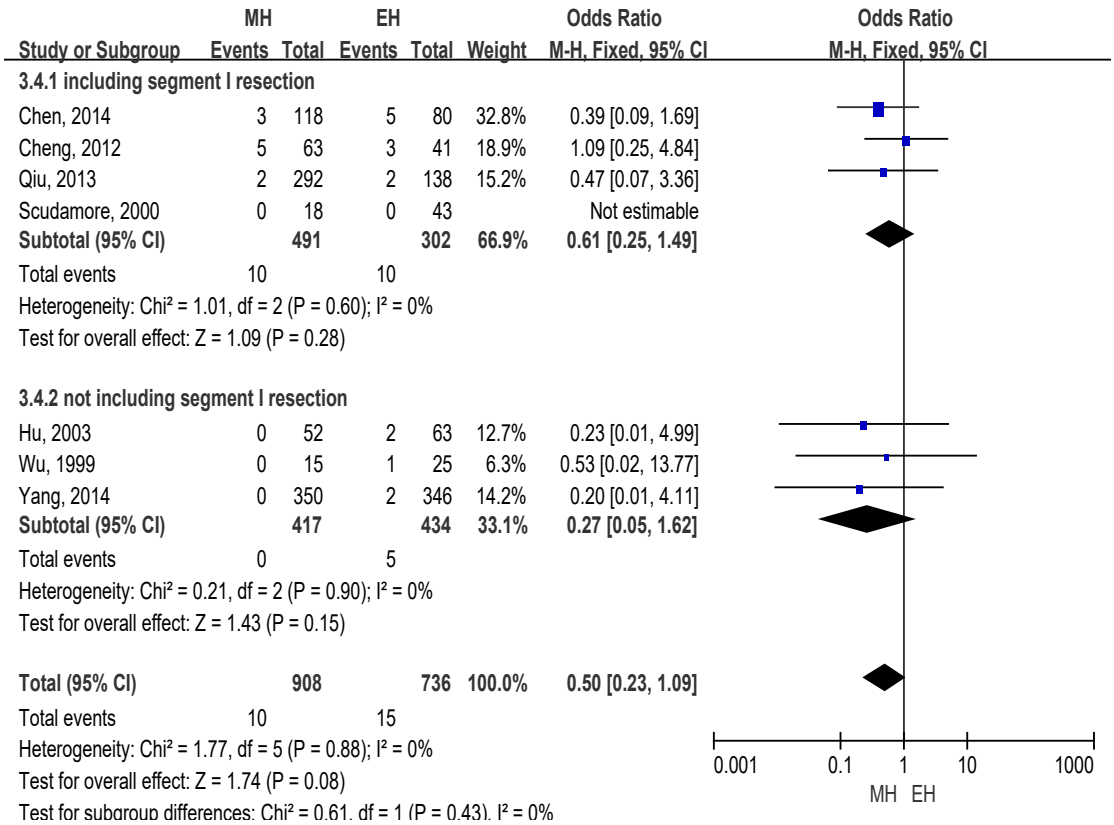


Fig G Subgroup analysis of mortality rate by type of MH

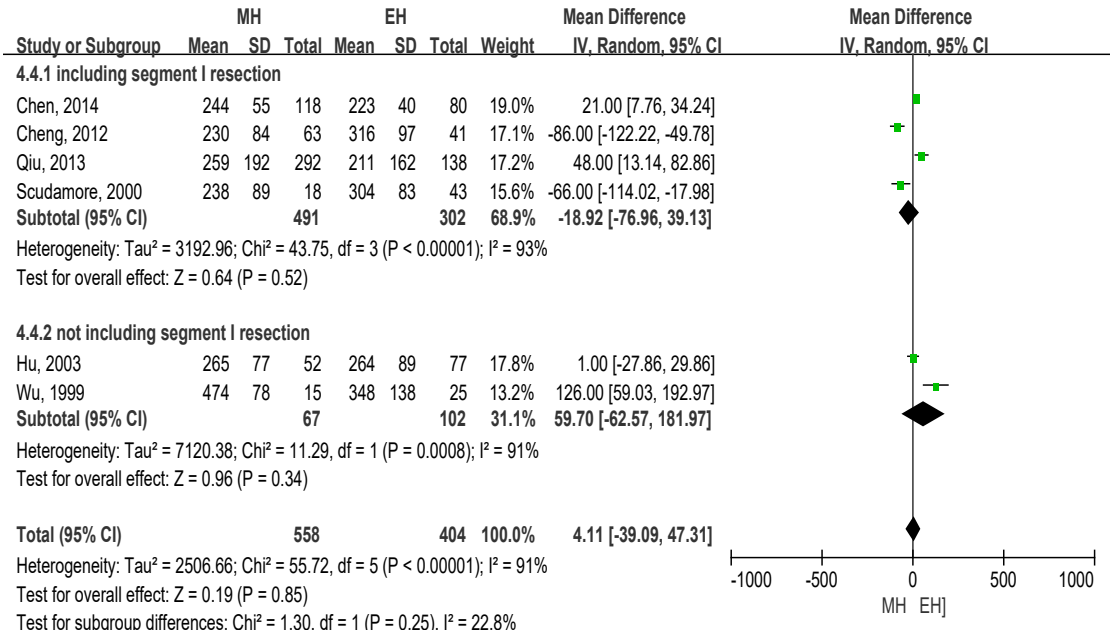


Fig H Subgroup analysis of operation time by type of MH

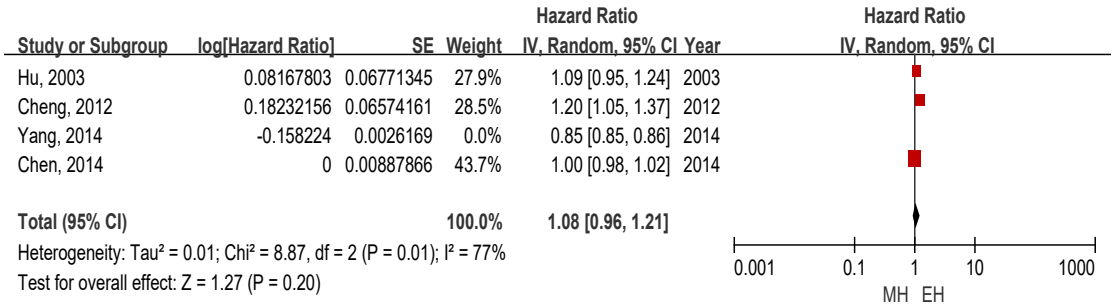


Fig I Sensitivity analysis of overall survival via removing the study manifested by high heterogeneity