



Laparoscopic liver re-resection is feasible for patients with posthepatectomy hepatocellular carcinoma recurrence

----- *a propensity score matching study*

Lei Zhang, M.D, Ph.D
Hepatobiliary Surgery
Sun Yat-sen Memorial Hospital

Background

Recurrence Rate of HCC

Epidemiology



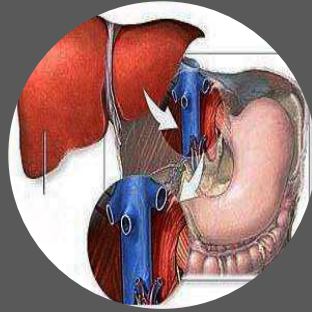
5-year recurrence rate of HCC is about **50%-70%**

80% of patients with intrahepatic recurrence

Treatment strategy

Technical challenges

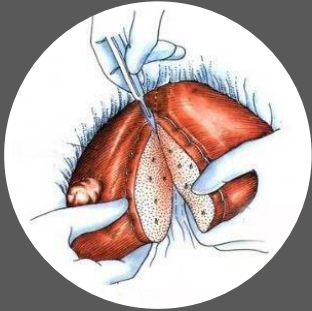
Background



Liver Transplantation

Shows impressive results
Insufficient supply of donor organs

Epidemiology



Repeat Hepatectomy

Potentially curative treatment
Resectability rate is less than 30%

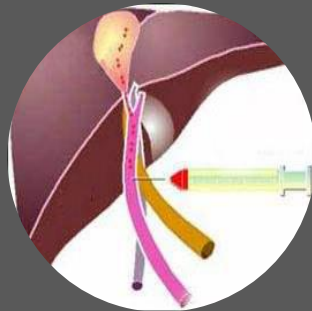
Treatment strategy



Ablation Therapy

Minimal invasive and repeatable
As effective as hepatic resection
Inferior long-term outcomes

Technical challenges



TACE

Most frequently used treatment
Questionable curative role

Background

Epidemiology

1 Presence of adhesions

2 Anatomy distortion

Treatment strategy

3 Impaired liver function

Technical challenges

4 Portal hypertension

Background

Minimal invasion

Epidemiology

1 Small incision & less pain

2 Reduced blood loss

Treatment strategy

3 Less complication

Technical challenges

4 Faster recovery
& shorter hospital stay

Whether

laparoscopic liver re-resection

for patients with posthepatectomy recurrent HCC

is feasible and safe ?

Method

Jan 2008 - Dec 2015, 30 patients with recurrent HCC after prior liver resection underwent laparoscopic liver re-resection

Patient Selection

Diagnosis

- Blood tests
- Abdominal ultrasonography
- CT / MRI

Liver function assessment

- ICG retention rate at 15 min (ICG₁₅)
- CT volumetry

The selection criteria

- Well-compensated liver function (Child- Pugh A)
- Absence of gross ascites
- No clinical signs of severe portal hypertension
- No extrahepatic metastasis
- No major blood vessel tumor invasion
- Each solitary tumor less than 5 cm

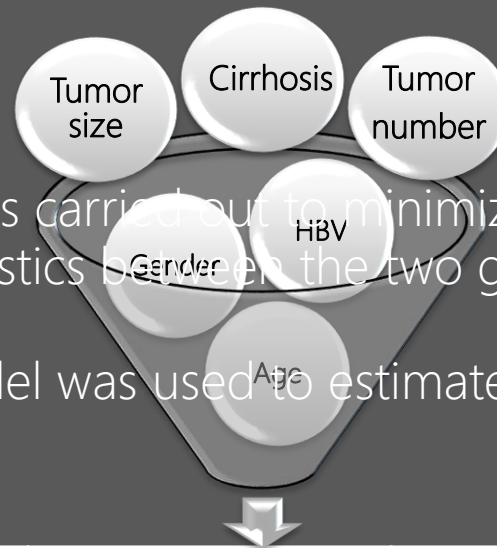
Propensity score matching

Method

Patient Selection

A 1:1 propensity score was carried out to minimize selection biases in the baseline characteristics between the two groups of patients.

A logistic regression model was used to estimate the propensity score.



Propensity score matching

Parameter	Open (n=30)	Lap. (n=30)	P
Age	48.5(28-79)	56.5(27-79)	0.121
Gender (male : female)	28:2	23:7	0.148
HBs Ag (+)	29 (96.67%)	29 (96.67%)	1.000
Cirrhosis	26 (86.67%)	26 (86.67%)	1.000
Tumor Size (cm)	2.45 (1.0-4.3)	2.1 (1.0-5.0)	0.964
Tumor Number	1 (1-2)	1 (1-2)	0.232
Single	28	25	0.421
Multiple	2	5	

Results

Patient characteristics

Short-term outcomes

Long-term outcomes

	Open (n=30)	Lap (n=30)	p*
Child-Pugh grade			0.236#
A	27	30	
B	3	0	
Microvascular invasion	9 (30%)	6 (20%)	0.371#
ICGR ₁₅ (%)	9 (4-34)	8.5 (2-33)	0.756
Serum ALT (U/L)	39 (3-152)	32.5 (9-281)	0.636
Serum AST (U/L)	38 (15-209)	31.5 (17-303)	0.433
Platelet count	153.5 (60-233)	162.5 (47-376)	0.819
TB (μmol/L)	14.65 (2.8-224.6)	15.25 (6.9-42.5)	0.756
Albumin (g/L)	42.2 (30.3-47.9)	42.75 (31.8-67.2)	0.154
α-fetoprotein(ng/ml)			0.542#
≤400	22	24	
> 400	8	6	
Interval of Recurrence (month)	17 (2-85)	17 (3-121)	0.589
Location (Couinaud section)			0.334#
Segment I	3	1	
Segment II, III, IVa, V, VI	15	18	
Segment IVb, VII, VIII	8	4	
Bilobar	4	7	

Values are presented as n (%) or median (range)

*Mann-Whitney U test unless indicated otherwise

#Chi-squared test or Fisher's exact test

Results

Patient characteristics

Short-term outcomes

Long-term outcomes

Perioperative detail	Open (n=30)	Lap (n=30)	P*
Operative time (min)	207.50(105-328)	200.5(68-525)	0.903
Pringle maneuver	3(10%)	0(0%)	0.236#
Blood loss (ml)	400(30-1800)	100(10-600)	0.000196
Transfusion	13(43.3%)	0(0.0%)	0.000046
Conversion to laparotomy	-	4(13.3%)	-
Hospital day	13.5(8-150)	9.5(5-29)	0.000008
90-day mortality	1(3.33%)	0(0%)	1.000
Grade of adhesion			0.695#
I	6	8	
II	14	16	
III	8	5	
IV	2	1	
Type of resection			0.553#
Sub-segmentectomy	18	19	
Segmentectomy	8	7	
Left lateral sectionectomy	1	3	
Major liver resection	3	1	
Intraoperative ablation	2(6.7%)	7(23.3%)	0.148#
Complication	10(30.0%)	2(6.7%)	0.01#
Bile leak	3	1	-
Intra-abdominal hemorrhage	1	1	-
Abdominal infection	4	0	-
Ascites	1	0	-
Liver failure	1	0	
Severity of complications (Clavien-Dindo)			
IIIa	4(13.3%)	1(3.33%)	0.350
IIIb	1(3.33%)	0(0%)	1.000
IVa	-	-	-
IVb	-	-	-
V	1(3.33%)	0(0%)	1.000

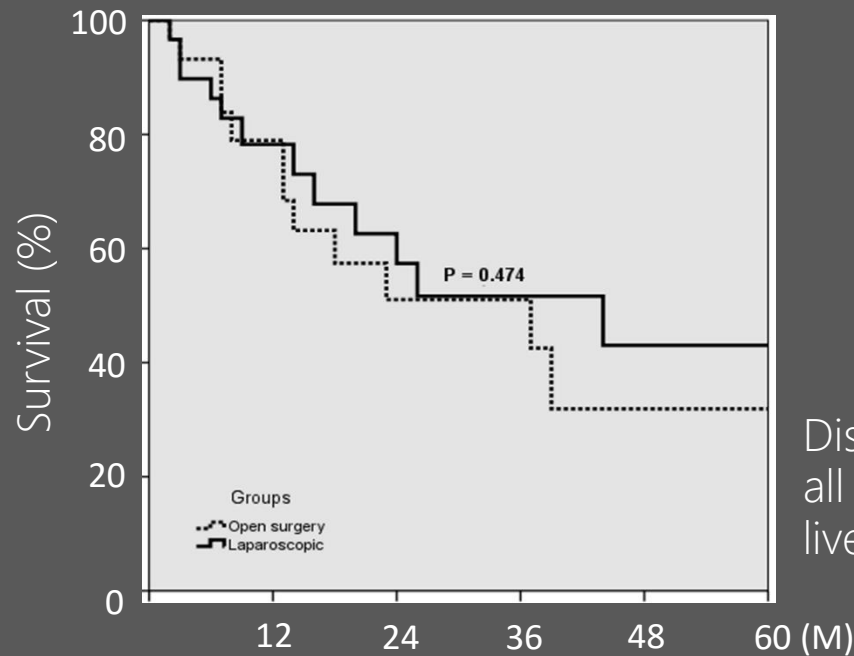
Results

The impact of the initial liver resection on liver re-resection, laparoscopically or open liver resection was further analyzed.

	Previous laparotomy (n=21)	Previous laparoscopy (n=9)	p*
Patient characteristics			
Tumor Size(cm)	2.0(1.0-5.0)	2.6(1.0-5.0)	0.504
Number of tumors	1(1-2)	1(1-2)	0.756
Single	17	8	1.000#
multiple	4	1	
Location (Couinaud section)			0.266#
Segment I	0	1	
Segment II,III,IVb,V,VI	13	5	
Segment Iva,VII,VIII	2	2	
Biblober	6	1	
Grade of adhesion			0.250#
I	4	4	
II	11	5	
III	5	0	
IV	1	0	
Long-term outcomes			
Blood Loss (ml)	100(10-600)	50(10-400)	0.449
Operation Time (min)	205(68-525)	196(70-264)	0.397
Conversion to laparotomy	3(14.2%)	1(11.1%)	1.000#
Hospital stay (day)	10(5-29)	8(5-14)	0.164
Complication	2(9.5%)	0(0%)	1.000#

Results

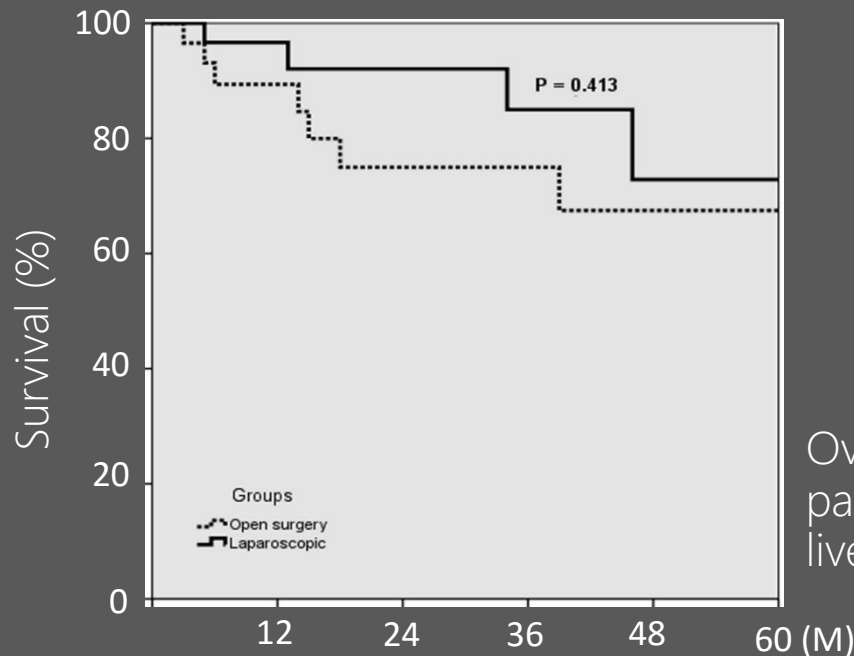
Patient characteristics



— Open surgery
..... Laparoscopic
P=0.474

Disease-free survival of all patients underwent liver re-resection

Short-term outcomes



— Open surgery
..... Laparoscopic
P=0.413

Overall survival of all patients underwent liver re-resection

Long-term outcomes

Feasibility

1 Adhesiolysis

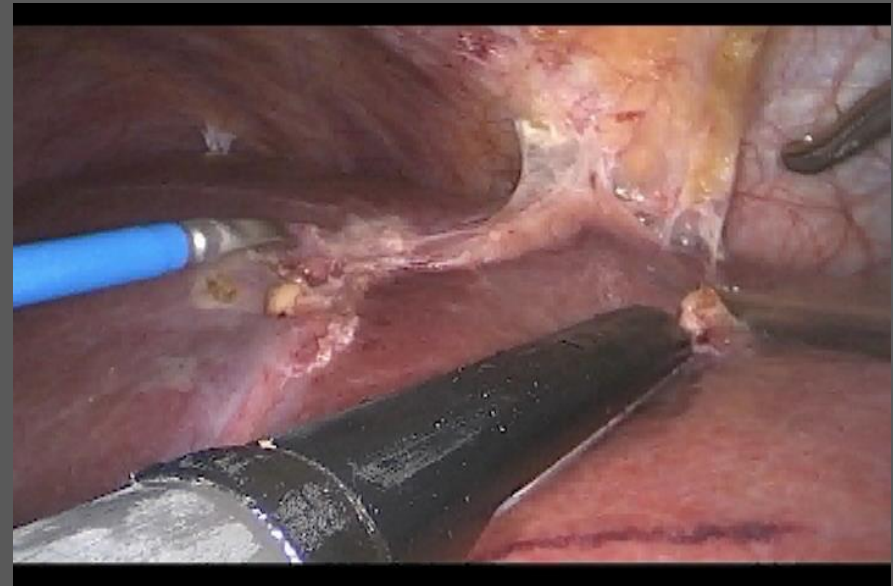
Precise dissection under optical magnification offered by laparoscopy

Pneumoperitoneum tenses up adhesion bands facilitate the operation and reduce surgical time

2 Bleeding Control 2 Parenchymal preservation

Routine use of intraoperative ultrasound

Advanced transection devices



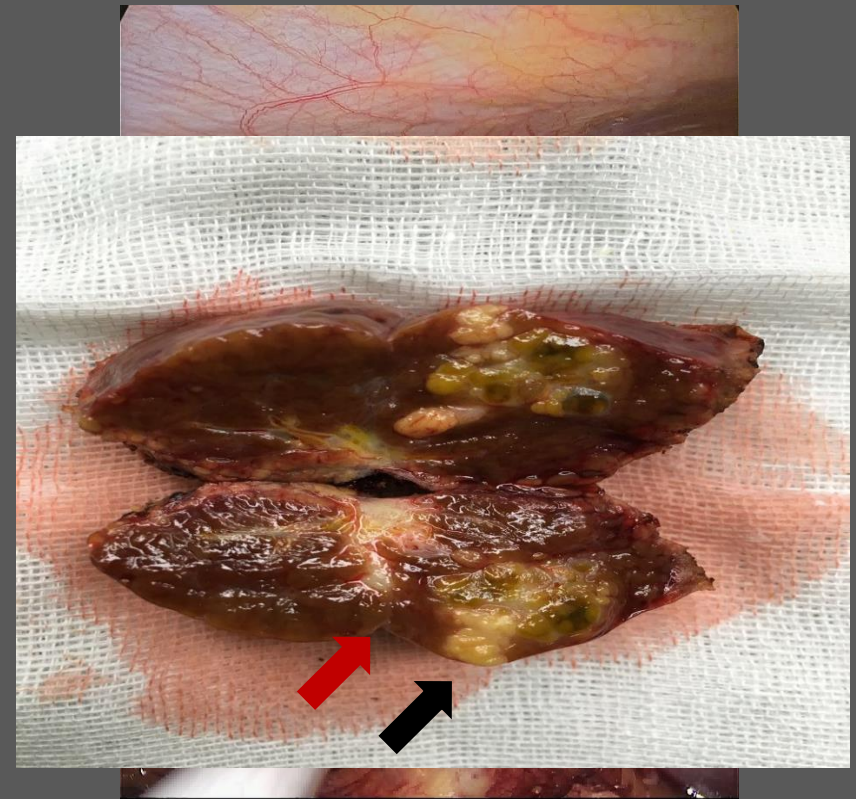
Why we do it

Adhesion resulted from previous hepatectomy can be safely tackled

Advantages of minimal invasion

Alleviate the burden on the donor organ pool

Avoiding incomplete necrosis and the incidence of needle tract dissemination caused by ablation



Conclusion

Liver re-resection for patients with posthepatectomy HCC recurrence

Laparoscopic VS open surgery

Reduced requirement of blood transfusion

Lower morbidity rate

Shorter hospital stay

Satisfactory comparable oncological outcomes

Minimal invasion and
faster recovery

Acceptable surgical risk

Providing another
treatment preference

Merci
