

Emergent Transarterial Embolization of Spontaneous Ruptured Hepatocellular Carcinoma: Single-Center Experience

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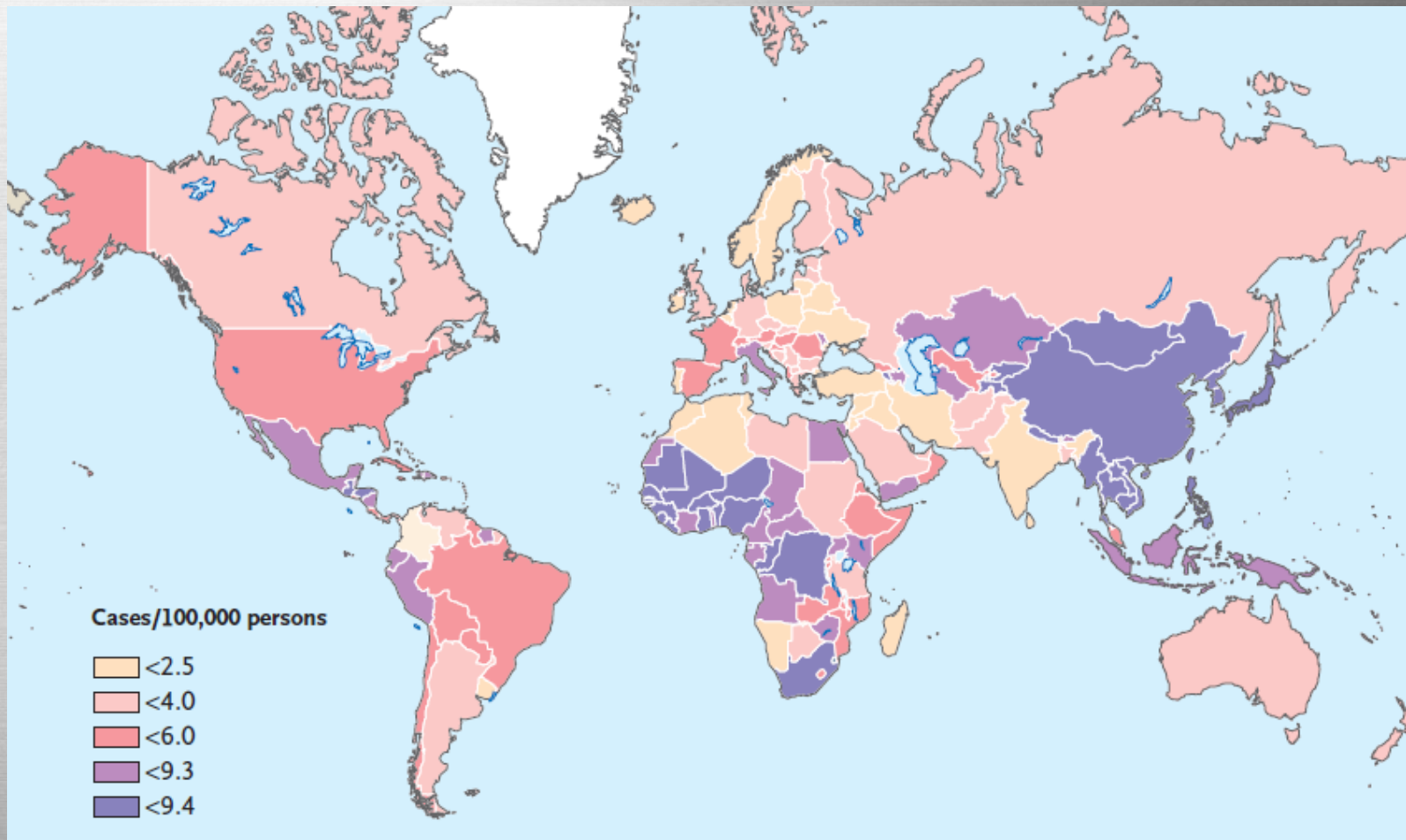
Introduction

- Liver cancer is a frequently diagnosed cancer worldwide.
 - the fifth in men
 - the seventh in women
- More than half a million hepatocellular carcinoma (HCC) cases are diagnosed worldwide every year.

Jemal, A., et al., *Global cancer statistics*. CA Cancer J Clin, 2011. **61**(2): p. 69-90.

El-Serag, H.B., *Hepatocellular Carcinoma*. New England Journal of Medicine, 2011. **365**(12): p. 1118-1127.

- HCC disproportionately affects the **Asia-Pacific region**.
 - Asia-Pacific region accounts for more than two-thirds of all HCC cases and deaths.



Regional Variation in the Estimated Age-Standardized Incidence Rates of Liver Cancer.

World Health Organization, International Agency for Research on Cancer. GLOBOCAN 2008.

- The major risk factor of HCC is **cirrhosis**, particularly related to chronic viral hepatitis, alcoholic cirrhosis, cirrhosis caused by hemochromatosis, and primary biliary cirrhosis.
- Worldwide, chronic HBV infection accounts for approximately 50% of all cases of HCC and virtually all childhood cases.

McEvoy, S.H., et al., *Hepatocellular Carcinoma: Illustrated Guide to Systematic Radiologic Diagnosis and Staging According to Guidelines of the American Association for the Study of Liver Diseases*. RadioGraphics, 2013. **33**(6): p. 1653-1668.

El-Serag, H.B., *Hepatocellular Carcinoma*. New England Journal of Medicine, 2011. **365**(12): p. 1118-1127.

Epidemiology in Taiwan

- HCC is the second leading cause of cancer-related death in Taiwan.

Kung, C.T., et al., *Transcatheter arterial embolization in the emergency department for hemodynamic instability due to ruptured hepatocellular carcinoma: analysis of 167 cases.* AJR Am J Roentgenol, 2008. **191**(6): p. W231-9.

Spontaneous Rupture of HCC

- A life-threatening complication.
- The incidence ranges from 3 to 15% in patients with HCC.
 - be higher in Asian countries than in Western countries

Kung, C.T., et al., *Transcatheter arterial embolization in the emergency department for hemodynamic instability due to ruptured hepatocellular carcinoma: analysis of 167 cases.* AJR Am J Roentgenol, 2008. **191**(6): p. W231-9.

Kim, J.Y., et al., *Transcatheter arterial chemoembolization confers survival benefit in patients with a spontaneously ruptured hepatocellular carcinoma.* Eur J Gastroenterol Hepatol, 2012. **24**(6): p. 640-5.

- may occur as a terminal event in patients with advanced disease
- may be the first presentation in an otherwise healthy individual

- Clinical diagnosis was suspected when patients with
 - epigastric or right upper-quadrant abdominal pain
 - abdominal distention
 - hypovolemic shock
- The diagnosis is frequently missed or delayed.

Liu, C.-L., et al., *Management of Spontaneous Rupture of Hepatocellular Carcinoma: Single-Center Experience*. *Journal of Clinical Oncology*, 2001. **19**(17): p. 3725-3732.

Aim of Work

- The aim of this study was to assess the **clinical features** and **survival rate** in patients with a spontaneous ruptured hepatocellular carcinoma and treated with transarterial embolization (TAE).

Study Design

- Period: January 2010 ~ December 2012
- Location: China Medical University Hospital,
a 2500-bed hospital in Taiwan
- Method: Retrospective case series study
- Patients number: 38

Diagnosis of Ruptured HCC

- Abdominal computed tomography (CT) :
 - visualization of a hepatic tumor with features of HCC associated with
 - peritumoral or paratumoral contrast leakage
 - peritoneal spillage of contrast medium
 - peritumoral or paratumoral hematoma
 - hyperdense intraperitoneal fluid accumulation

- Patients with a history of HCC and high index of suspicion.

AND, bloody fluid was collected by abdominal paracentesis.

Static Analysis

- 30-day mortality as the primary end point
- Patients who survived underwent follow-up for at least 1 year.
- → a group who died within 30 days after TAE (n=17)
- → a group who survived more than 30 days after TAE (n=21)

Results

Table 1: Comparison of Clinical Findings Between Mortality and Survival Groups

Characteristic	Group Who Died (n=17)	Group Who Survived (n=21)	P
Age (y)	70.7 (42~88)	64.4 (37~81)	0.04
Sex			0.392
Men	14 (82.35%)	17 (80.95%)	
Women	3 (17.65%)	4 (19.05%)	
Abdominal pain			0.29
Absent	4 (23.53%)	4 (19.05%)	
Present	13 (76.47%)	17 (80.95%)	
Shock			0.409
Absent	6 (35.29%)	8 (38.1%)	
Present	11 (64.71%)	13 (61.9%)	
Blood Transfusion before TAE			0.586
No	0 (0%)	9 (42.86%)	
Yes	17 (100%)	12 (57.14%)	
Packed RBC (no. of 250-ml units)	4.3 (2~12)	1.6 (1~6)	

Characteristic	Group Who Died (n=17)	Group Who Survived (n=21)	P
HBV			0.293
Absent	10 (58.82%)	14 (66.67%)	
Present	7 (41.18%)	7 (33.33%)	
HCV			0.63
Absent	9 (52.94%)	11 (52.38%)	
Present	8 (47.06%)	10 (47.62%)	
Liver cirrhosis			1
Absent	2 (11.76%)	4 (19.05%)	
Present	15 (88.24%)	17 (80.95%)	
History of HCC			
Absent	4 (23.53%)	5 (23.81%)	
Present	13 (76.47%)	16 (76.19%)	
Child-Pugh class			0.948
A	1 (5.88%)	4 (19.05%)	
B	9 (52.94%)	15 (71.43%)	
C	7 (41.18%)	2 (9.52%)	

Clinical Information

- Age: 67.2 (37~88)
 - Group who died: 70.7 (42~88)
 - Group who survived: 64.4 (37~81)
- Male: 31 (81.58%)
- Female: 7 (18.4%)
- Abdominal pain: 30 (78.94%)
- Shock: 24 (63.16%)

- Blood transfusion before TAE: 29 (76.31%)
 - Group who died: 17 (100%); 4.3 units (2~12)
 - Group who survived: 12 (57.14%); 1.6 units (1~6)
- HBV: 14 (36.84%)
- HCV: 18 (47.37%)
- Liver cirrhosis: 32 (84.21%)
- Unknown to have HCC: 9 (23.68%)

Child-pugh Class

	Group Who Died (n=17)	Group Who Survived (n=21)
A	1 (5.88%)	4 (19.05%)
B	9 (52.94%)	15 (71.43%)
C	7 (41.18%)	2 (9.52%)

Table 2: Comparison of Laboratory Findings

Characteristic	Group Who Died (n=17)	Group Who Survived (n=21)	P
Initial SBP (mmHg)	95.65 (55~144)	105.15 (57~158)	0.15
Initial mean pressure (mmHg)	71 (42~120)	77 (41~111)	0.42
Hemoglobin (mg/dL)	8.7 (5.1~13.8)	9.9 (5.1~14.3)	0.06
International normalized ratio	1.41 (1.08~3.71)	1.15 (0.9~1.86)	0.052
Liver function			
Aspartate aminotransaminase (IU/L)	133.3 (43~376)	88.6 (24~399)	0.054
Alanine aminotransferase (IU/L)	51.3 (17~79)	75.4 (19~399)	0.12
Total bilirubin (mg/dL)	2.1 (0.1~8.8)	1.4 (0.5~5.2)	0.1
Albumin (g/dL)	2.4 (1~3.5)	3 (2.2~4)	0.0011

Laboratory findings

- Initial systolic blood pressure: 101mmHg
 - Group who died: 96 mmHg
 - Group who survived: 105 mmHg

- Initial mean blood pressure: 73 mmHg
 - Group who died: 71 mmHg
 - Group who survived: 77 mmHg

- Hemoglobin (Hb):
 - Group who died: 8.7 mg/dL
 - Group who survived: 9.9 mg/dL

- International normalized ratio (INR):
 - Group who died: 1.41
 - Group who survived: 1.15

Liver function

- Aspartate aminotransaminase (IU/L)
 - Group who died: 133.3 IU/L
 - Group who survived: 88.6 IU/L
- Alanine aminotransferase (IU/L)
 - Group who died: 51.3 IU/L
 - Group who survived: 75.4 IU/L

- Total bilirubin (mg/dL)
 - Group who died: 2.1 mg/dL
 - Group who survived: 1.4 mg/dL
- Albumin (g/dL)
 - Group who died: 2.4 g/dL
 - Group who survived: 3 g/dL

Table 3: Comparison of Imaging Findings

Characteristic	Group Who Died (n=17)	Group Who Survived (n=21)	P
Tumor Location			1
Left	3 (17.65%)	4 (19.05%)	
Right	3 (17.65%)	5 (23.81%)	
Bilateral	11 (64.71%)	12 (57.14%)	
Vascular invasion			0.392
Absent	10 (58.82%)	18 (85.71%)	
Present	7 (41.18%)	3 (14.29%)	
Stage			0.722
1	4 (23.53%)	5 (23.81%)	
2	4 (23.53%)	5 (23.81%)	
3	5 (29.41%)	6 (28.57%)	
4	4 (23.53%)	5 (23.81%)	
Active contrast leakage on angiograms			0.983
Absent	3 (17.65%)	8 (38.1%)	
Present	14 (82.35%)	13 (61.9%)	
Left	4 (23.53%)	6 (28.57%)	
Right	7 (41.18%)	5 (23.81%)	
Bilateral	3 (17.65%)	2 (9.52%)	

Imaging findings

- Tumor location:
 - Left: 7 (18.4%)
 - Right: 8 (21.1%)
 - Bilateral: 23 (60.5%)
- Vascular invasion: 10 (26%)
 - Group who died: 7 (41.2%)
 - Group who survived: 3 (14.3%)

Stage

	Group Who Died (n=17)	Group Who Survived (n=21)
1	4 (23.53%)	5 (23.81%)
2	4 (23.53%)	5 (23.81%)
3	5 (29.41%)	6 (28.57%)
4	4 (23.53%)	5 (23.81%)

- Active contrast leakage on angiograms
 - Absent: 11 (28.9%)
 - Present: 27 (71.1%)

	Group Who Died with Active Contrast Leakage (n=14)	Group Who Survived with Active Contrast Leakage (n=13)
Right	4 (28.6%)	6 (46.2%)
Left	7 (50%)	5 (38.5%)
Bilateral	3 (21.4%)	2 (15.3%)

- The group who died (n=17) presented **worse clinical condition** and **elder** status than the group who survived (n=21).

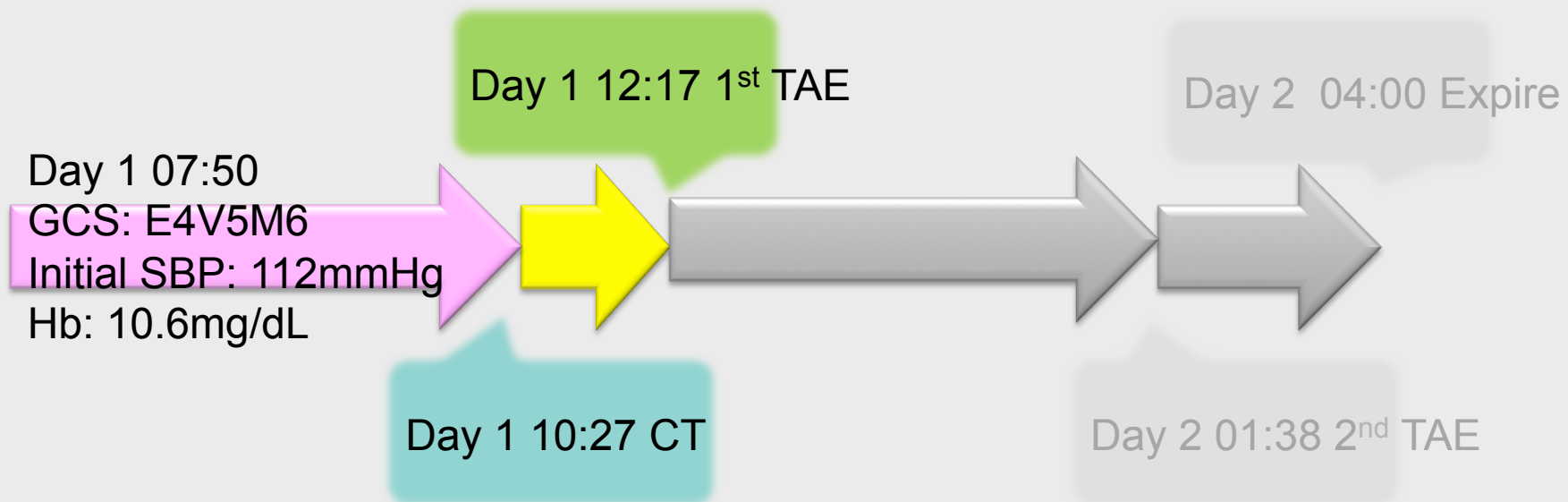
- The group who died had:
 - a poorer Child-Pugh class
 - lower hemoglobin level
 - lower serum albumin level
 - higher demand for blood transfusion
 - greater prevalence of portal vein thrombosis
 - higher serum total bilirubin level
 - higher aspartate aminotransferase level

Treatment

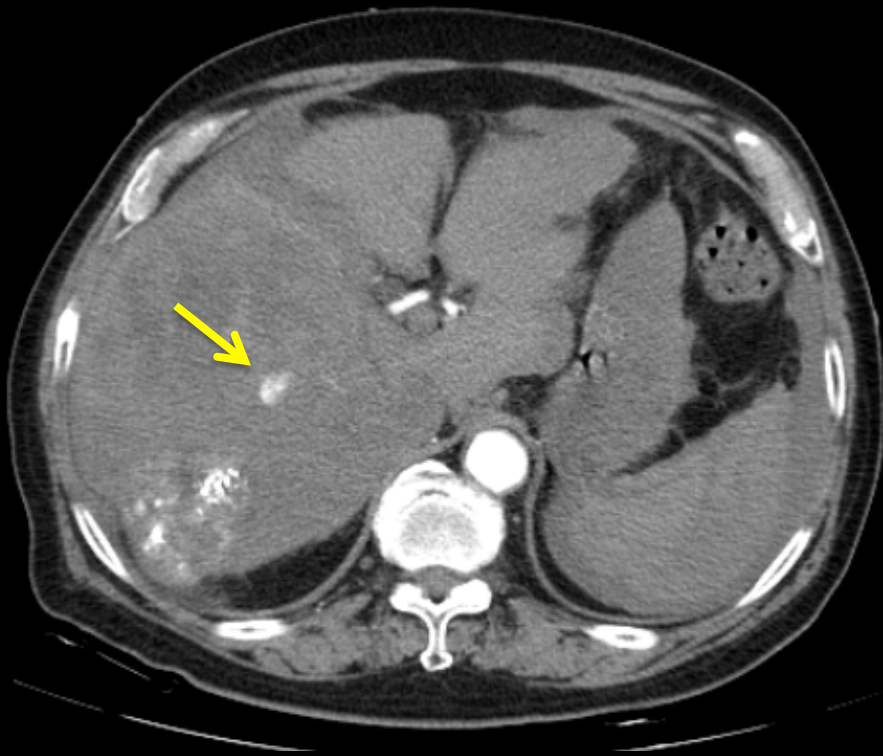
- Aim of primary management with emergent TAE:
 - Attain hemostasis
 - Preserve as much functioning liver parenchyma as possible
- Secondary management:
 - Elective resection
 - Palliative chemoembolization in patients
 - Supportive treatment in patients

Secondary TAE

- 81 years old
- Male
- T3bN0M0, Stage 3B

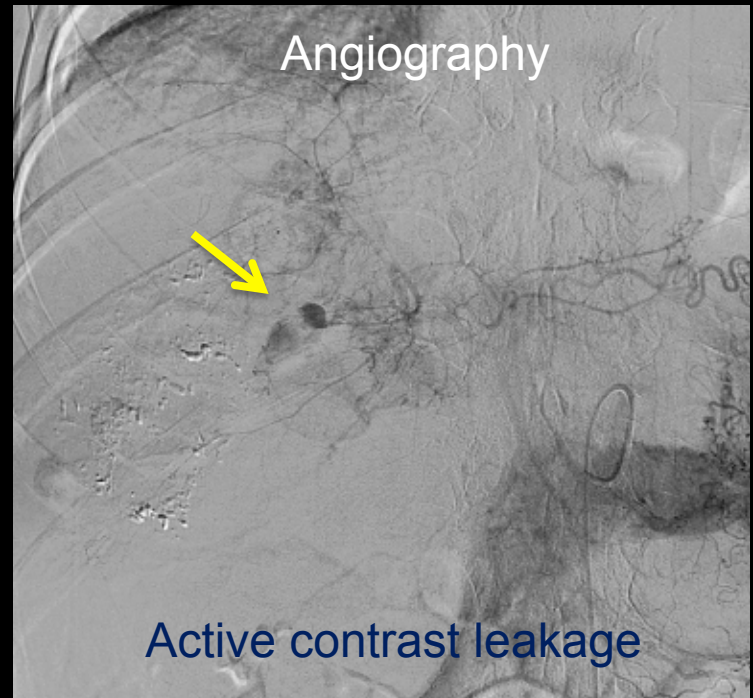


Pre-TAE CT



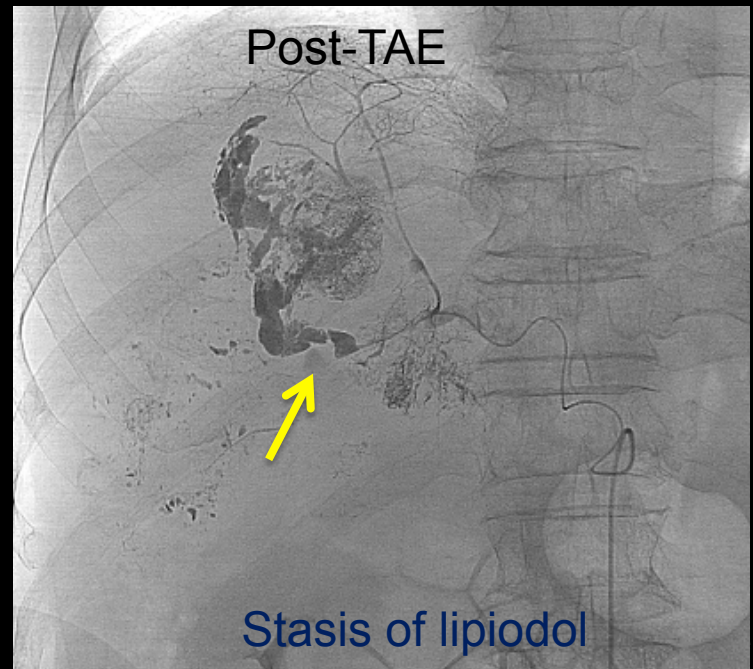
Active contrast leakage

Angiography



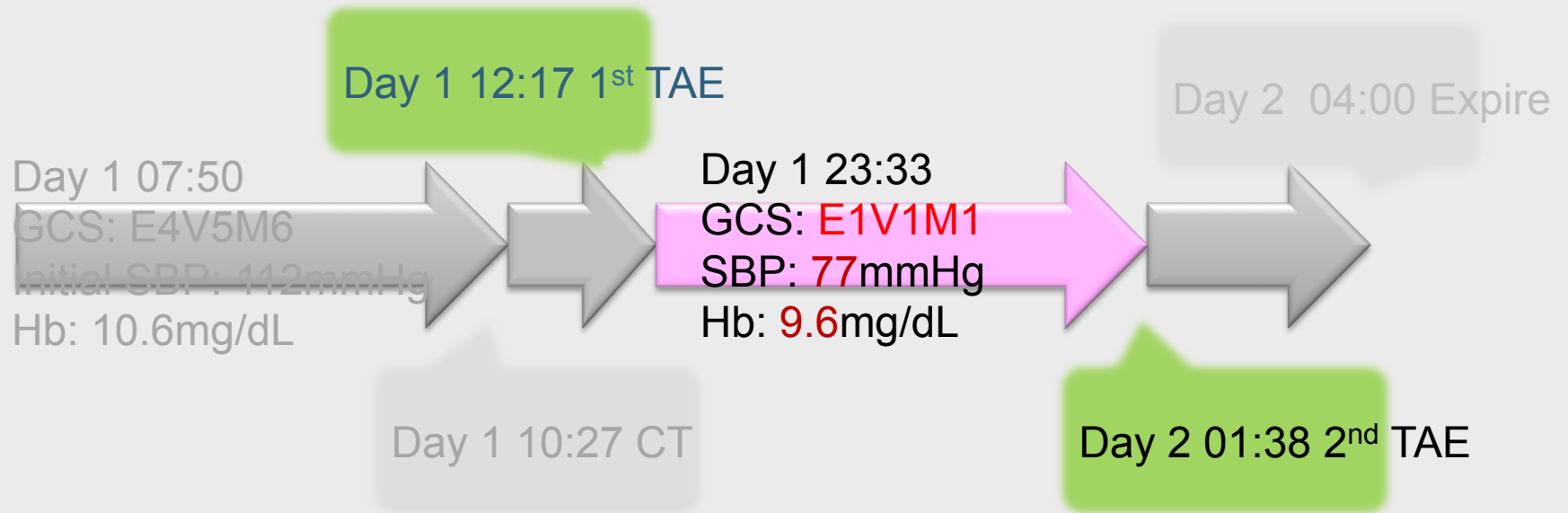
Active contrast leakage

Post-TAE



Stasis of lipiodol

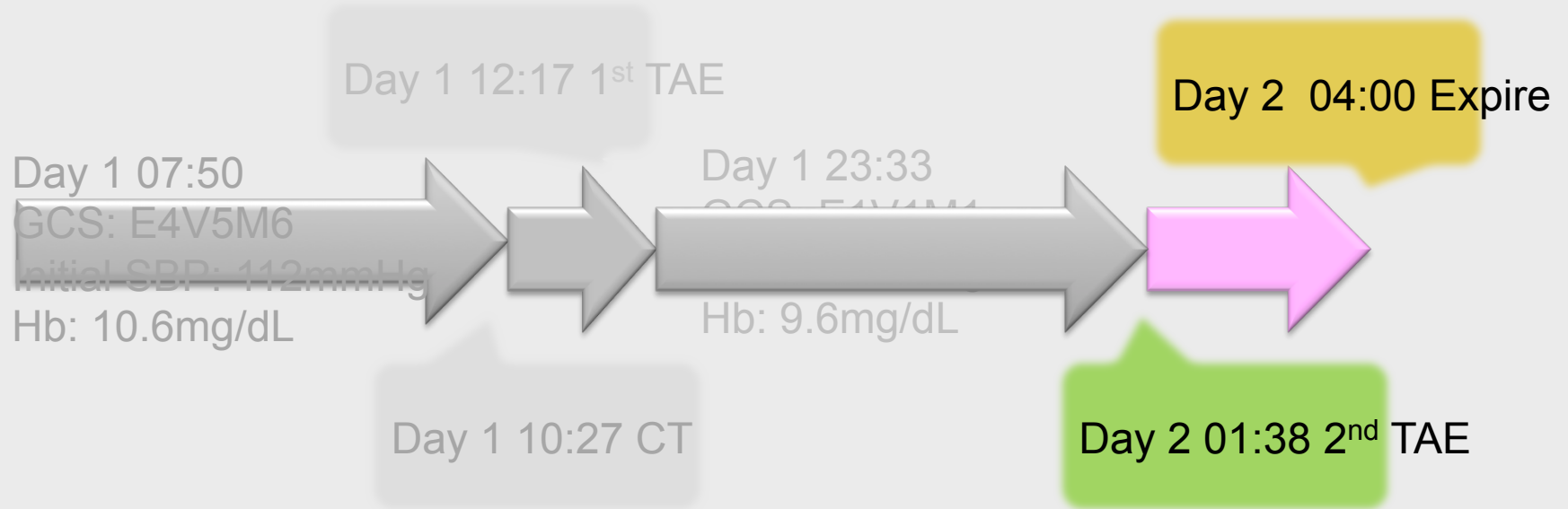
Secondary TAE



2nd angiography



Secondary TAE

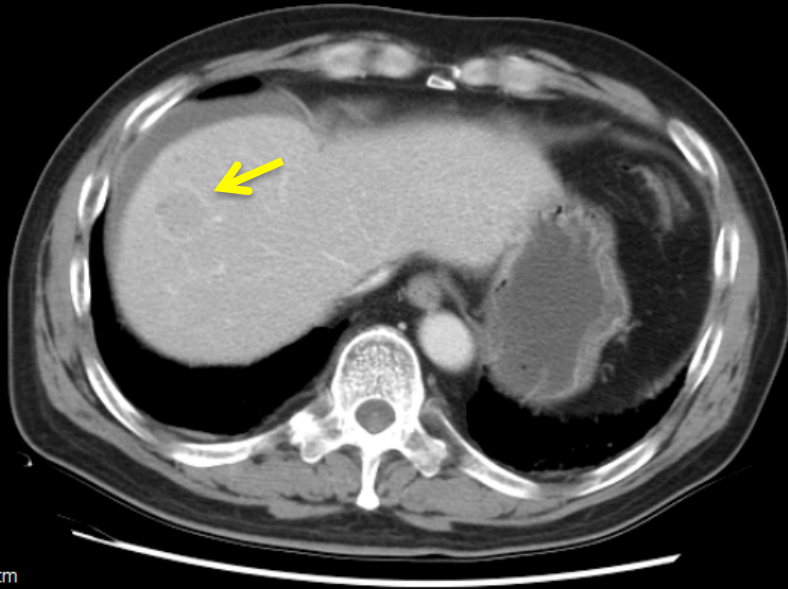


Elective Resection

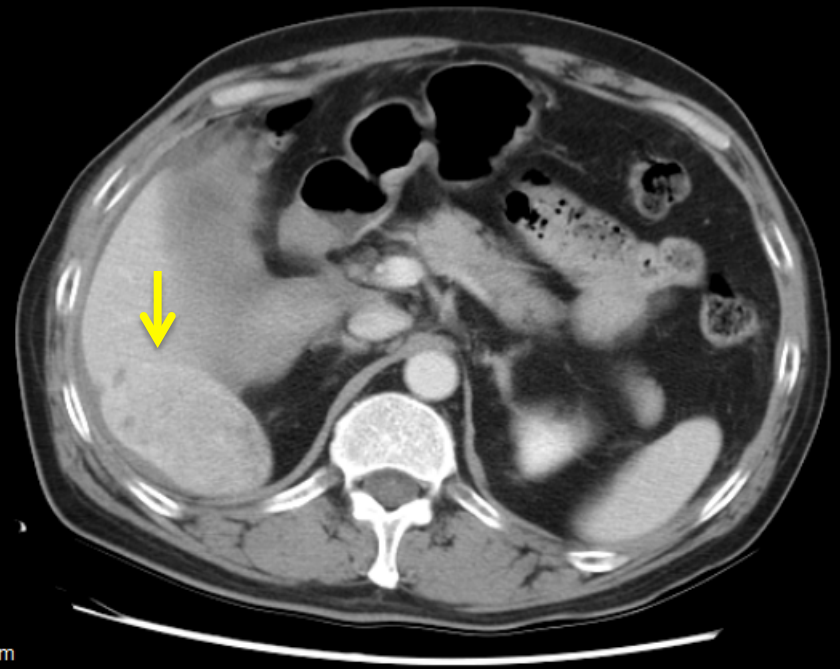
- 58 years old
- Male
- T3bN0M0, Stage 3B

- Right lobectomy 10 days later

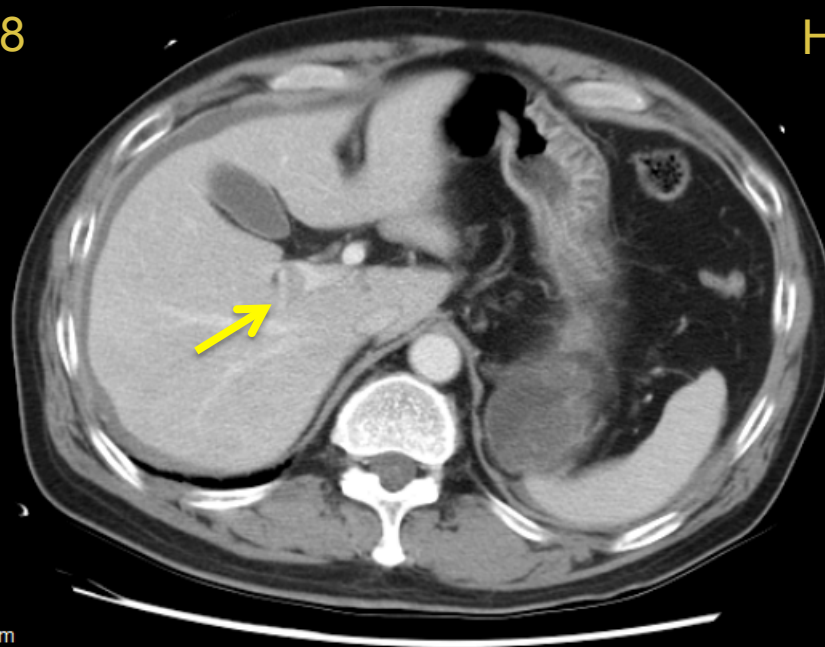
Pre-TAE CT



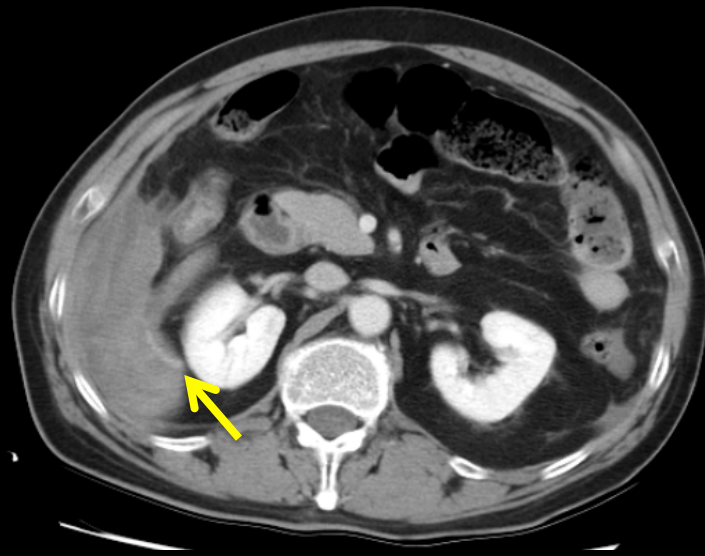
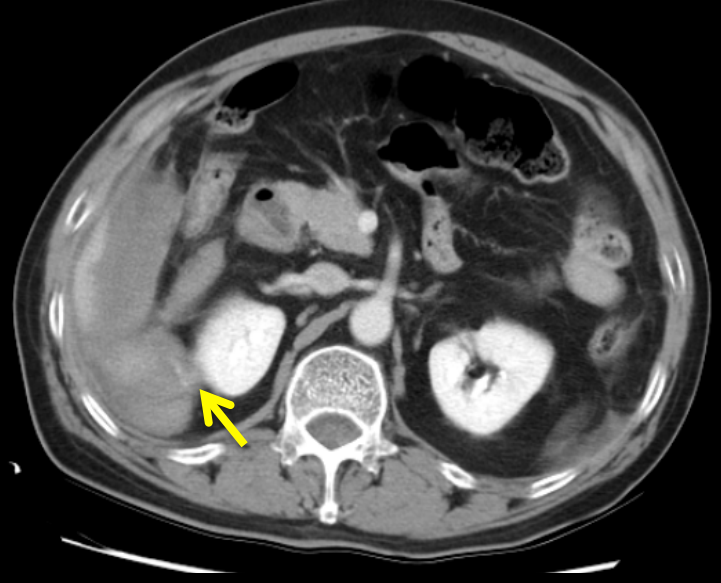
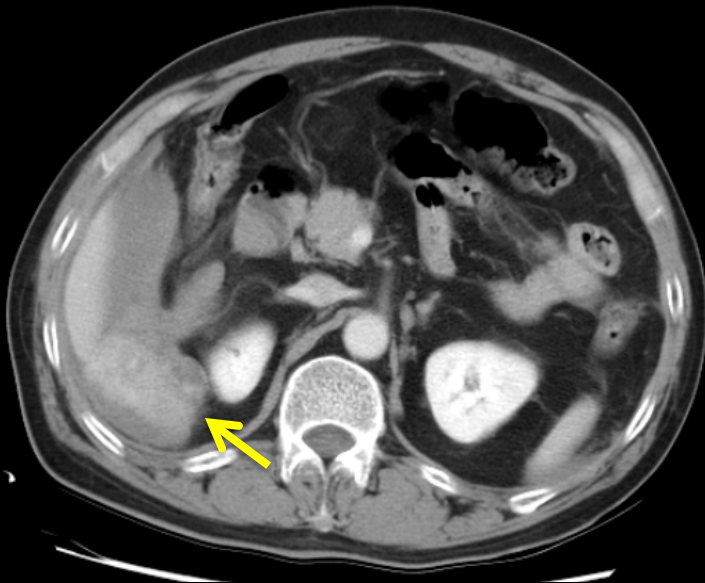
HCC in S8



HCC in S6

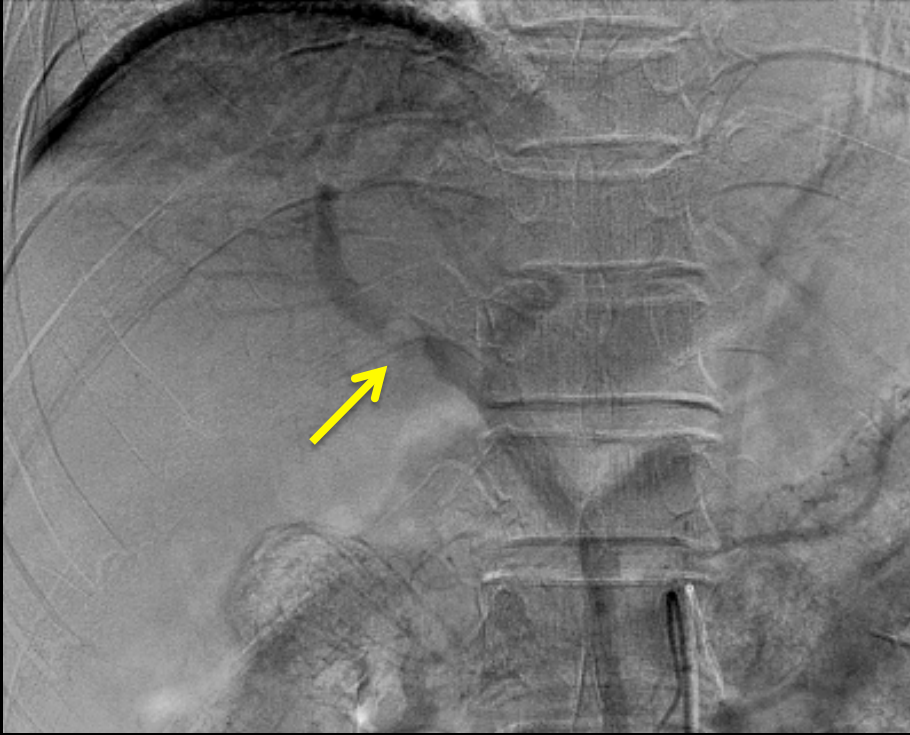


Thrombus in right portal vein branch



Active contrast leakage

Angiography



Thrombus in right portal vein branch

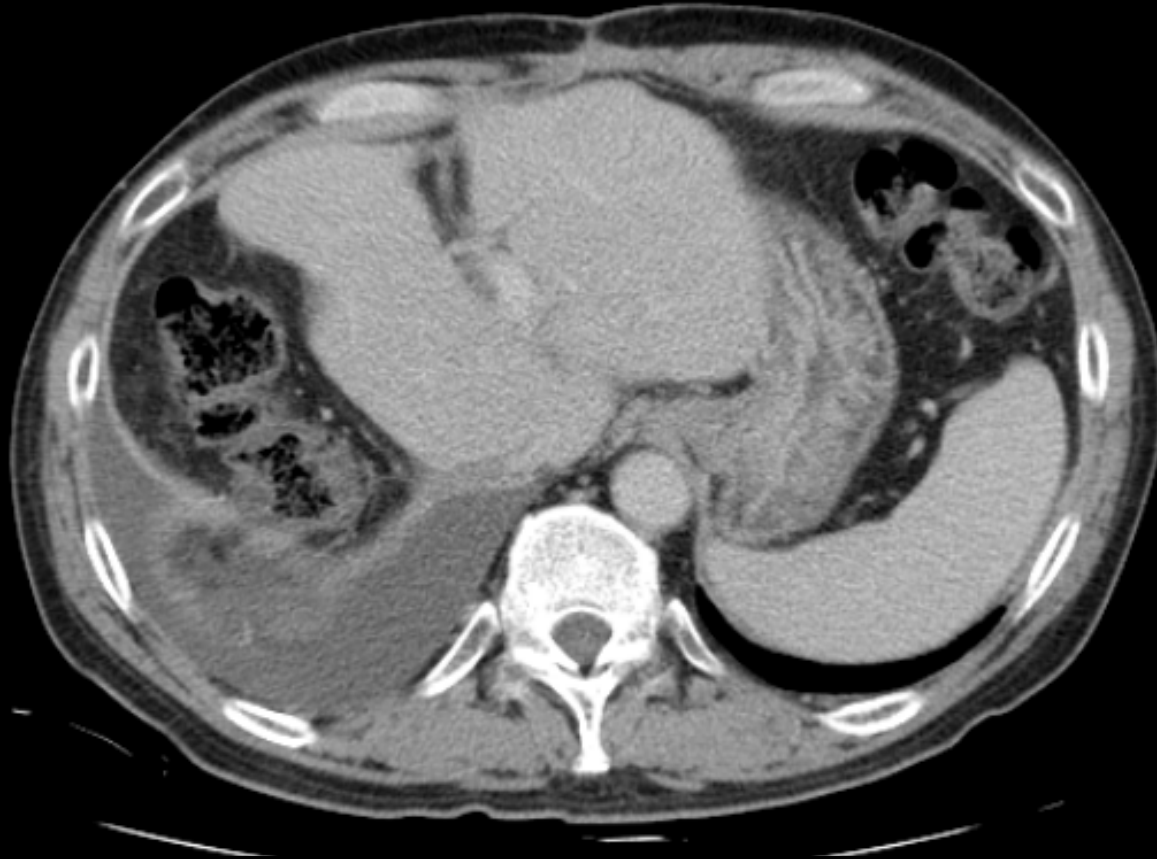


Active contrast leakage

Post-TAE CT (4 days later)



Post-resection CT (2 months later)



- Successful hemostasis with transcatheter arterial embolization was achieved in 87% of patients.

Conclusion

- Emergency transcatheter arterial embolization is a minimally invasive and effective treatment for hemostasis of ruptured hepatocellular carcinoma.
- Patients with poorer clinical condition and elder status are at high risk of death.

Thanks for your attention!!