Pre-hepatectomy Portal Vein Embolization using a Sheathless, 18-Gauge Fine Needle Approach: Review of Efficacy and Safety

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Background

Surgical resection is the mainstay of curative treatment in many patients with primary liver tumor. Major hepatic resections however put patients at risk of complications related to liver insufficiency.

Portal vein embolization (PVE) is an established procedure, to enhance future liver remnant (FLR).

Instead of conventional PVE with sheath-catheter technique, our center adopts a 18-G fine-needle-only approach for portal vein embolization

Objective

To retrospectively evaluate the efficacy and safety of PVE via access using 18-G fine needle instead of conventional sheath-catheter technique

Materials & Methods

Study design

- Retrospective review of clinical records of patients who received PVE in a tertiary referral teaching hospital in Hong Kong

Subjects

- 45 patients/PVE included in the period from 2009 to 2017.

Assessment Parameters

- Percentage increase of volume of future liver remnant (FLR)
- Increase in ratio of FLR to total liver volume
- Minor and major complications

Procedure

- CT Volumetry; PVE considered when FLR ratio is less than 30% (normal Liver function) or 40% (cirrhotic patients)
- Right portal system puncture with 18G fine needle; Diagnostic portovenogram and embolization with NCBA/lipiodol mixture injected under fluoroscopic screening
- Reassessment CT performed 4-6 weeks later
- Liver resection will be performed within a week for patients with satisfactory FLR hypertrophy

Results

Patient Demographics

- Mean age 60 +/- 7.6 years-old; 38 males (84%)
- 15 patients (33%) with cirrhosis (Child's A:14; Child's B: 1)
- Planned surgery – Right hepatectomy (19 patients; 42%) & Extended right hepatectomy (26 patients; 58%)

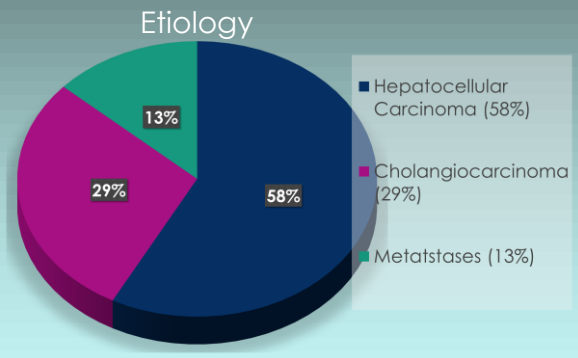

Fig. 1(Left) Portovenogram via 18G needle in seg VII branch, outlining conventional anatomy of right portovenous system. (Right) Post-PVE fluoroscopic image: satisfactory glue cast in the right portovenous system. Note the lipiodol staining of seg VIII HCC after previous TACE.

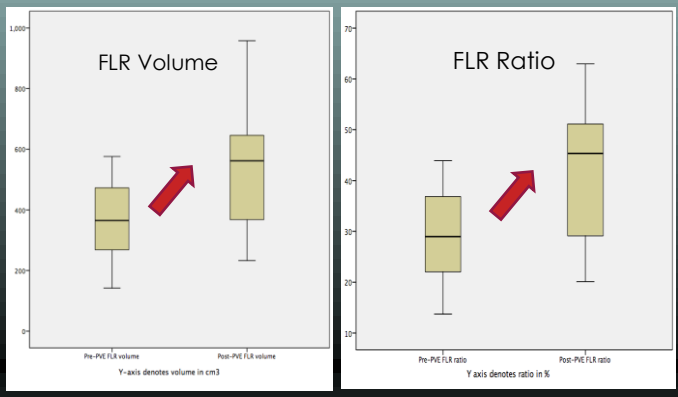

Fig. 2 Box plots showing change in FLR volume (Left) and FLR Ratio (Right) before and after portal vein embolization

- Complete pre & post PVE CT volumetry data available for 23 patients (51%)
- Mean percentage increase of FLR volume was 50% +/- 33%
- Mean FLR ratio increase was 12.5% +/- 7.7%
- Resection rate – 73% (33/45); Only 2% due to inadequate FLR hypertrophy, other related to new metastases/medical conditions
- 3 major complications (6.7%) & 3 minor complications (6.7%) as defined by Society of Interventional Radiology (SIR)
- No procedure-related mortality

Discussion

- Mean increase in FLR ratio satisfies the Quality Improvement Guideline for Portal Vein Embolization by CIRSE, which quoted between 8%-25% (normal liver function) or 6%-20% (in Cirrhotic patients
- Rate of minor complications within the threshold by CIRSE Guideline (below 20%), 6.7% major complications slightly exceeded the threshold (5%)
- No bleeding complications such as haemobilia, haemoperitoneum or hepatic artery pseudoaneurysm

Conclusions

PVE through a fine needle, sheathless approach is feasible with satisfactory FLR hypertrophy. Compared with the traditional approach, it may be faster, less traumatic and with a similar safety profile

Selected References

1 Denys A, Bize P, Demartines N, et al (2010) Quality Improvement for Portal Vein Embolization. Cardiovasc Intervent Radiol 33:452–456 . doi: 10.1007/s00270-009-9737-x

2 Sacks D, McClenny TE, Cardella JF, Lewis CA (2003) Society of Interventional Radiology clinical practice guidelines. J Vasc Interv Radiol JVIR 14:S199-202

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