

presence of ascites, total serum bilirubin levels, and the ICG disappearance rate for deciding the eligibility of the patients for a resection and the type of the surgical resection. In patients with uncontrolled ascites, bilirubin levels above 2 mg/dL, any type of hepatectomy is contraindicated. The ICG uptake rate in “Makuuchi criteria” is used as objective criteria for deciding the extent of the resection that can be safely performed. According to the ICG uptake resections, that can be safely performed are classified as, major hepatectomy (ICG < 10%), segmentectomy < 1/3 of liver (10% < ICG < 19%), subsegmentectomy < 1/6 of liver (20% < ICG < 29%), and a limited resection (ICG > 30%) [Figure 4].^[20]

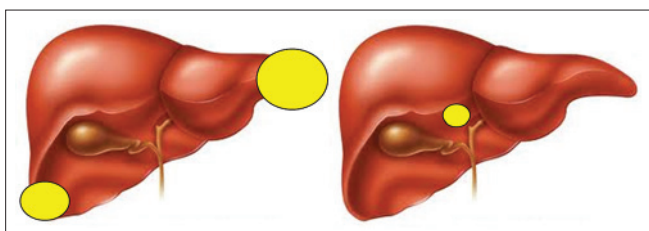


Figure 2: Location may be as important as the number and size of the tumors for technical feasibility of surgical resection

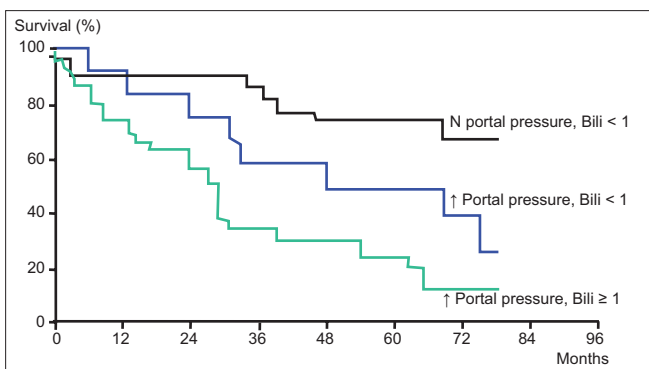


Figure 3: Resection of < 5 cm tumors in Child-Pugh A patients according to the bilirubin and portal hypertension (adopted from Llovet *et al.*^[18])

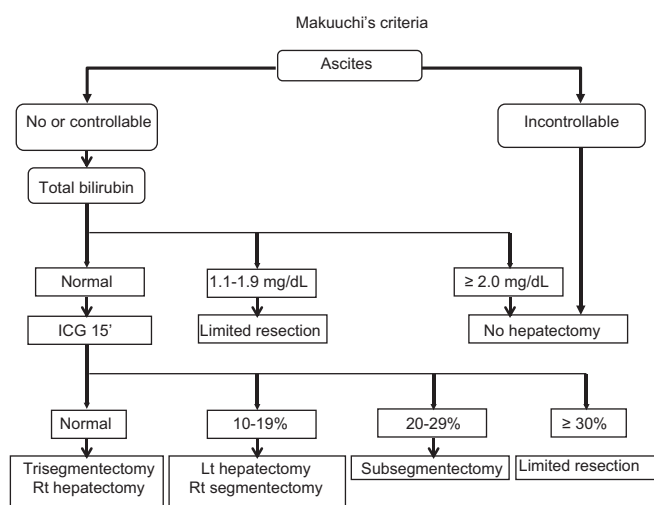


Figure 4: Makuuchi criteria for safe hepatectomy. ICG: Indo-cyanine Green; Lt: left; Rt: right

We have to say that while deciding a surgery for a patient with HCC, we use the BCLC and the other algorithms, as well. To avoid a misunderstanding, we have to highlight that we do not try to create an alternative system to the well-known systems (such as BCLC and others) to evaluate the HCC patients. This mnemonic flowchart may only help in assessing a systematic check of this important clinical decision-making process. Here, we just want to re-read the BCLC and other algorithms from another direction, but more simply and practically in the daily life. In our clinical practice, lots of HCC patients are referred to our department for the aim of resection from other cities by several clinicians. We observed that most clinicians (surgeons, but not an expert on liver surgery, oncologists, gastroenterologists, or internists) focus only on the size or number of the tumors in the liver while they were referring their patients. However, the general condition of the patient (mostly bedridden or not), bone pains (the possible metastasis), platelet counts, or presence of esophageal varices, *etc.*, can be overlooked before the transfers of the patients. Sometimes the simplest points are missing in the complex algorithms. “PERISH” flowchart can be used as a simple checklist in the clinical evaluation of the patients with HCC. This mnemonic flowchart could be more useful for the clinicians who are not experts on HCC. We believe that an easy learning method for the selection of the most appropriate candidates for surgical resection can create a charm among the non-expert clinicians on HCC, as well. This mnemonic can make the evaluation of the HCC patients more attractive due to its simplicity.

CONCLUSION

Asking for the patients’ general condition, that is, whether the patient is symptomatic and in bed > 50% of the day, should be the first question to select the correct cases for the resectable HCCs. Following this, asking for suspicious metastasis as bone pain and radiological evaluation of the abdomen and thorax is mandatory. Calculation of the Child-Pugh score is only the third step of the evaluation. Good candidates for a surgical resection should be Child-Pugh “A” but a better subgroup “A” with normal bilirubin levels should be preferred. Technical feasibility of the resection according to the intra-hepatic distribution of the tumor(s) should be done radiologically, and the patients preferably should not have portal hypertension. If the patient fulfills all the previous steps, the surgeon can perform the ICG clearance test, if necessary [Table 3].

As a result, following the “PERISH” flowchart in the treatment of any HCCs may prevent “perish” of the surgeons while deciding the appropriate treatment of HCCs.

Table 3: PERISH flowchart

PERISH flowchart

Performance of the patient (ECOG)
Extra-hepatic disease (metastasis)
Reserve of the liver (Child-Pugh score)
Intra-hepatic distribution (CT)
Stratifying risk factors (portal hyper-tension and bilirubin)
Hepatectomy size (Makuuchi-ICG)

ECOG: Eastern Cooperative Oncology Group; CT: computed tomography;
ICG: Indo-cyanine Green

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Conflict of interest

There is no conflict of interest.

REFERENCES

1. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. *CA Cancer J Clin* 2005;55:74-108.
2. Llovet JM, Burroughs A, Bruix J. Hepatocellular carcinoma. *Lancet* 2003;362:1907-17.
3. Chang MH, You SL, Chen CJ, Liu CJ, Lee CM, Lin SM, Chu HC, Wu TC, Yang SS, Kuo HS, Chen DS; Taiwan Hepatoma Study Group. Decreased incidence of hepatocellular carcinoma in hepatitis B vaccinees: a 20-year follow-up study. *J Natl Cancer Inst* 2009;101:1348-55.
4. Llovet JM, Di Bisceglie AM, Bruix J, Kramer BS, Lencioni R, Zhu AX, Sherman M, Schwartz M, Lotze M, Talwalkar J, Gores GJ; Panel of Experts in HCC-Design Clinical Trials. Design and endpoints of clinical trials in hepatocellular carcinoma. *J Natl Cancer Inst* 2008;100:698-711.
5. El-Serag HB, Mason AC. Rising incidence of hepatocellular carcinoma in the United States. *N Engl J Med* 1999;340:745-50.
6. Sirivatanauksorn Y, Tovikkai C. Comparison of staging systems of hepatocellular carcinoma. *HPB Surg* 2011;2011:818217.
7. Llovet JM, Brú C, Bruix J. Prognosis of hepatocellular carcinoma: the BCLC staging classification. *Semin Liver Dis* 1999;19:329-38.
8. Oken MM, Creech RH, Tormey DC, Horton J, Davis TE, McFadden ET, Carbone PP. Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am J Clin Oncol* 1982;5:649-55.
9. Thomas RL. Learning the alphabet of healthcare IT. *Healthc Financ Manage* 2006;60:100-2.
10. Stalder DR. Learning and motivational benefits of acronym use in introductory psychology. *Teach Psychol* 2005;32:222-8.
11. Liver Cancer Study Group of Japan. Primary liver cancer in Japan. Clinicopathologic features and results of surgical treatment. *Ann Surg* 1990;211:277-87.
12. Fasani P, Sangiovanni A, De Fazio C, Borzio M, Bruno S, Ronchi G, Del Ninno E, Colombo M. High prevalence of multinodular hepatocellular carcinoma in patients with cirrhosis attributable to multiple risk factors. *Hepatology* 1999;29:1704-7.
13. Natsuizaka M, Omura T, Akaike T, Kuwata Y, Yamazaki K, Sato T, Karino Y, Toyota J, Suga T, Asaka M. Clinical features of hepatocellular carcinoma with extrahepatic metastases. *J Gastroenterol Hepatol* 2005;20:1781-7.
14. Sasaki Y, Imaoka S, Shibata T, Wada H, Nagano H, Ishikawa O, Furukawa H, Fukuda I, Kyoama H, Doi O. Successful surgical management of pulmonary and adrenal metastases from hepatocellular carcinoma. *Eur J Surg Oncol* 1991;17:84-90.
15. Manizate F, Hiotis SP, Labow D, Roayaie S, Schwartz M. Liver functional reserve estimation: State of the art and relevance for local treatments: the Western perspective. *J Hepatobiliary Pancreat Sci* 2010;17:385-8.
16. Franco D, Capussotti L, Smadja C, Bouzari H, Meakins J, Kemeny F, Grange D, Dellepiane M. Resection of hepatocellular carcinomas. Results in 72 European patients with cirrhosis. *Gastroenterology* 1990;98:733-8.
17. Nagasue N, Yukaya H, Kohno H, Chang YC, Nakamura T. Morbidity and mortality after major hepatic resection in cirrhotic patients with hepatocellular carcinoma. *HPB Surg* 1988;1:45-56.
18. Llovet JM, Fuster J, Bruix J. Intention-to-treat analysis of surgical treatment for early hepatocellular carcinoma: resection versus transplantation. *Hepatology* 1999;30:1434-40.
19. Nagasue N, Yukaya H, Ogawa Y, Kohno H, Nakamura T. Human liver regeneration after major hepatic resection. A study of normal liver and livers with chronic hepatitis and cirrhosis. *Ann Surg* 1987;206:30-9.
20. Makuuchi M, Kosuge T, Takayama T, Yamazaki S, Kakazu T, Miyagawa S, Kawasaki S. Surgery for small liver cancers. *Semin Surg Oncol* 1993;9:298-304.