Abstract: The therapeutic modalities for hepatocellular carcinoma (HCC) have diversified during the past decades, and in particular, the treatment has mainly been concentrated on small HCC of 3 cm or less. Therefore, it has become very important for surgeons to be able to identify the clinical indications for liver resection in HCC.

We reviewed data on liver resection for HCC using the National Primary Hepatic Cancer follow-up survey report of the Liver Cancer Study Group of Japan, indicating problem associated with liver resection for HCC. As a result, the indications of surgical treatment for HCC are as follows: (1) In patients with HCC of 3 cm or less in diameter, a solitary HCC indicates liver resection. However, priority should be given to medical treatment such as percutaneous transhepatic ethanol injection therapy, microwave coagulative necrosis therapy for multiple HCC and patients with clinical states II or III. (2) HCC between 3 cm and 5 cm in diameter is a good indicator for liver resection. Solitary HCC indicates liver resection as a first choice. (3) HCC greater than 5 cm in diameter and cases with tumor stages II or III indicate liver resection. (4) There are limits to treating HCC with tumor thrombus in the second branch of the portal vein (Vp2) and tumor thrombus in the first branch, the trunk of the portal vein or in a branch on the opposite side (Vp3) only by liver resection. (5) HCC with tumor thrombus in the right, middle or left hepatic vein trunk, posterior inferior hepatic vein trunk or short hepatic vein (Vv2) and with tumor thrombus in the inferior vena cava (Vv3) are indicators for liver resection. A limited resection according to Glisson's structure and with a negative surgical margin can be performed in HCC of 5 cm or less, however an extended resection is required for HCC greater than 5 cm. Furthermore, the extent of liver resection should be considered according to the hepatitis virus. Finally, it was emphasized that effective measures against the postoperative recurrence was essential in order to improve the outcome of HCC.

Key words: indication of liver resection, hepatocellular carcinoma, tumor size
I. Characteristics and the problem of HCC in Japan

The characteristics and problem of HCC in Japan are discussed in this section. The prevalence of HCC is high in Japan, and it is crucial to understand the disease's characteristics and issues to develop effective treatment strategies.

II. Changes to the therapeutic modality for HCC

This section outlines the changes to the therapeutic modality for HCC. The introduction of new treatments has significantly improved the outcomes for patients with HCC.

III. Results and indications for surgical treatment for HCC

The results and indications for surgical treatment for HCC are presented in this section. Surgical treatment is considered the primary treatment for early-stage HCC, and the outcomes are discussed in detail.

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![Graph showing the number of patients](image)

![Graph showing percentage of stages](image)
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![Graph showing survival rates for solitary and multiple tumors.](image)

- **Solitary (n=50)**
- **Multiple (n=31)**

**p = 0.0080**

**p = 0.1691**
IV. The appropriate liver resection with special reference to recurrence after surgery

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V. Challenge and limits of surgical treatment for HCC

1. Challenge and limitations of surgical treatment for HCC

The treatment of HCC is based on tumor size and the presence of other risk factors, including age, liver function, and comorbidities. The surgical approach is mainly through either hepatic resection or transplantation, depending on the tumor characteristics and patient factors. However, surgical treatment is limited by various factors, including patient eligibility and tumor characteristics.

2. Surgical limits and challenges in treating HCC

The main challenges in surgical treatment for HCC include:

- Tumor size: Tumors larger than 5 cm are considered challenging to resect and may require transplantation.
- Location: tumors located in critical areas of the liver, such as the caudate lobe, may be difficult to resect.
- Liver function: patients with Child-Pugh grade B or C liver function are not candidates for surgical treatment.
- Recurrence: despite surgical resection, HCC often recurs due to diffusion and lymphatic spread.

Surgical treatment for HCC is challenging due to the limited ability to resect tumors without damaging critical liver tissue.

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