

The Scientific Hepatectomy: Pioneering Approaches for Tackling Liver Cancer

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Cancer research is an ever-evolving field of science fuelled by the pressure of the ongoing need to find new approaches to tackle this killer. Dr Zhi-yong Huang is based at the Tongji Medical College at Huazhong University of Science and Technology in China. He works tirelessly to develop novel treatments for diseases of the liver and biliary system, with a particular focus on liver cancer surgery. He has pioneered methods to optimise the treatment of this type of cancer.

Fighting Hepatocellular Carcinoma

Hepatic (liver) cancer is one of the most commonly occurring forms of cancer and sits amongst the leading causes of cancer-related deaths around the globe. There are different types of liver cancers; one particularly commonly diagnosed form is called hepatocellular carcinoma (HCC), which appears as a tumour that grows on the liver.

Dr Zhi-yong Huang specialises in diseases of the liver and the biliary system, which is the anatomy responsible for releasing bile into the digestive system. He carries out his groundbreaking research at the Hepatic Surgery Centre at Tongji Hospital, part of the Tongji Medical College at Huazhong University of Science and Technology. His recent work has focused on expanding and refining the surgical interventions for HCC with the aim of optimising treatments and boosting survival rates.

Surgical Interventions

Dr Huang explains that the usual treatment for HCC involves surgical removal of the tumour. The least invasive option is a local ablation, where smaller tumours can be eliminated. However, this is limited by the size of the tumour and its location. For large tumours, a hepatectomy may be the best option. He adds that this is often considered to be the best option for patients who are in the early stages of HCC. However, cirrhosis is a condition commonly found in patients with HCC.

Cirrhosis is a chronic problem, which can have a number of different causes, where scar tissue forms in the liver, eventually resulting in organ failure. Liver failure is a leading cause of postoperative fatality after hepatectomy when performed in

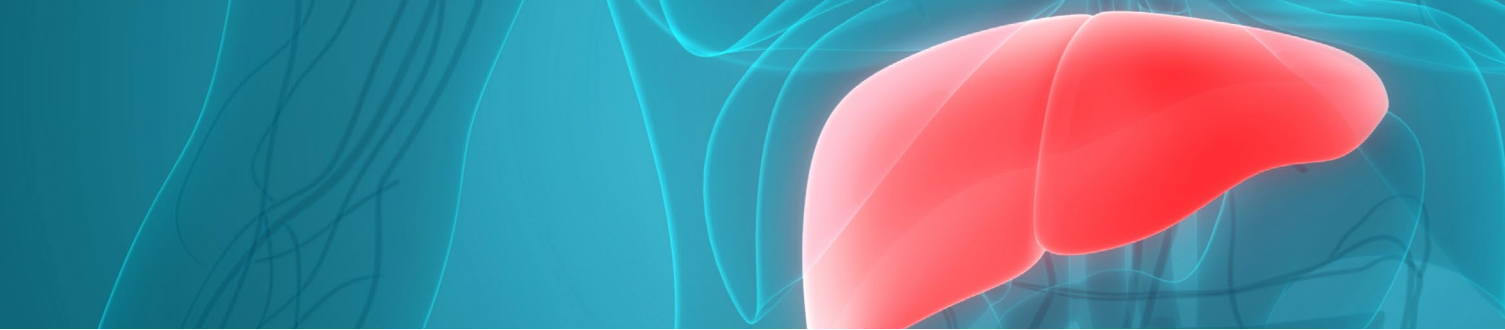
cirrhotic patients. The severity of cirrhosis in terms of pathological alterations varies from patient to patient, and its functional reserve can not be evaluated by current existing liver function parameters if the liver function is at the compensatory stages.

The same hepatectomy could be safely performed in one patient with mild cirrhosis but could be fatal in another patient with severe cirrhosis. This is why the underlying disease, such as liver cirrhosis, needs to be considered when making surgical decisions. Although a transplant can eliminate both a tumour and a cirrhotic liver, liver transplantation comes with its own set of challenges. The lack of donors and also high costs may make it unsuitable for patients with HCC. Regardless of these issues, however, the evidence shows that current hepatectomy methods do not necessarily offer the best chances of preventing the cancer from returning in the future.

The Great Debate

Dr Huang highlights that there is a long-lasting debate on the best approach for carrying out a hepatectomy with much of the focus being on the technical aspects. Anatomic resection, non-anatomic resection, and parenchyma-preserving hepatectomy are the common options, all involving the removal of differing amounts of liver tissue. He stresses that despite the availability of these various surgical options coupled with the advances in imaging technology and surgical instruments which allow these procedures to be performed with perfect technical precision, the 5-year tumour recurrence rate remains shockingly high, at values greater than 70%.

The current evidence suggests that the main cause of tumour recurrence after hepatectomy for HCC is linked to the underlying cirrhosis and also the spread of the tumour cells into the



blood vessels which cannot be completely eradicated by a hepatectomy. He adds that a scientific definition of the severity of cirrhosis is lacking in current surgical practice, and the choice of hepatectomy procedure is made solely on the surgeon's judgement of the severity of the cirrhosis. This has led to the muddying of the waters when it comes to surgical outcomes. Scientific staging of the cirrhosis severity could help to clarify the confusion over which type of hepatectomy is best to use in differing scenarios.

The Scientific Hepatectomy

Dr Huang stresses that the current strategy for selecting the most appropriate hepatectomy procedure needs urgent review in order to improve the long-term survival of HCC patients. As such, he has introduced the new concept of the Scientific Hepatectomy. Rather than focusing on just the type of procedure, this embraces a more holistic approach incorporating several important factors: underlying cirrhosis, liver protection, vascular invasion (when tumour cells spread to the blood vessels), and systemic therapy. These help to determine the extent and also timing of the hepatectomy in order to optimise the benefits and boost survival rates.

Since HCC recurrence cannot be stopped by hepatectomy alone, Dr Huang suggests that liver hepatectomy plus systemic therapy could offer a more solid solution to prevent the cancer from returning. Strategically integrating treatment with newly-emerging immunotherapies with the HCC surgery could optimise the benefits to the patient. These immunotherapy agents work in a variety of similar ways, all using the patient's own immune system to help them fight off the cancer cells. He adds that it is also vital

to determine the severity of the liver cirrhosis in order to allow the selection of the most appropriate hepatectomy procedure.

The Next Steps for HCC Surgery

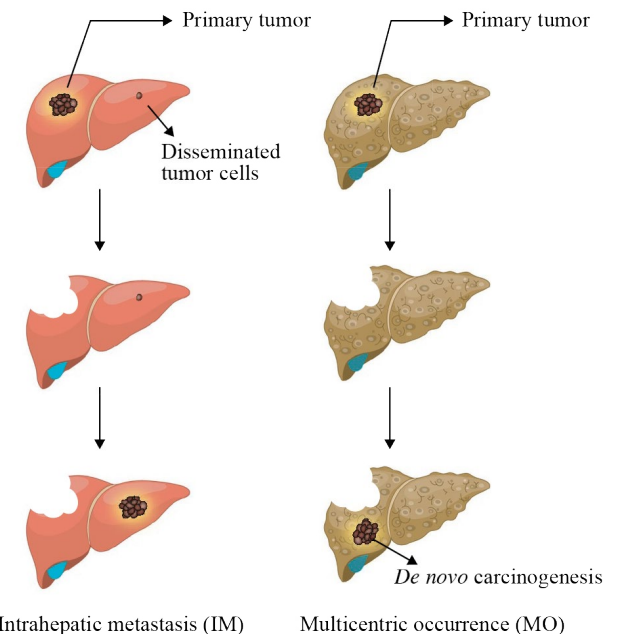
Dr Huang and his colleagues usher in a new era of HCC treatment with their concept of the Scientific Hepatectomy. He highlights how this procedure has evolved from being a purely technical concept focusing on an anatomic resection – the surgical removal of tissues – into a scientific concept encompassing the technical considerations with the current research advances in underlying liver cirrhosis, vascular invasion, and systemic treatments with immunotherapies. The severity of liver cirrhosis significantly impacts the safety and long-term outcomes of the surgery, and it must be scientifically staged in order to allow the individualisation of surgical approaches for each HCC patient. It also addresses the presence of vascular invasion, which is the systematic aspect of HCC which cannot be removed along with the liver.

The overarching result of his concept allows the indications, timings, and surgical techniques used in hepatectomy to be scientifically optimised for each patient, thereby reducing recurrence rates and prolonging long-term survival. Dr Huang's work challenges the traditional concepts of hepatectomy for treating HCC, emphasising scientific perspectives beyond the usual technical aspects when devising surgical strategies. Along with his team, he brings fresh hopes for improved long-term survival rates for the sufferers of this devastating disease.



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MEET THE RESEARCHER



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Dr Zhi-yong Huang obtained his MD from Tongji Medical College in 1996 and then completed his postdoctoral training at Washington University, St Louis, in the USA. He is currently a Professor of Surgery and the Vice-Chair of the Department of General Surgery at Tongji Hospital, which is affiliated with Huazhong University of Science and Technology in Wuhan, China. Dr Huang carries out his research in hepato-pancreato-biliary diseases, with a particular focus on the surgical treatment and immunotherapy for hepatocellular carcinoma. He has also introduced the concept of Scientific Hepatectomy for this condition. He has published over 190 papers in peer-reviewed journals and holds leadership positions within a number of prestigious medical associations, including the International Hepato-Pancreato-Biliary Association, the Asian-Pacific Hepato-Pancreato-Biliary Association, Biliary Surgery Work Group of the Chinese College of Surgeons, Liver Cancer Committee of the China Anti-Cancer Association (CACA), and the CACA Liver Cancer Committee of Hubei Province.

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FURTHER READING

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