

# Hepatic Perfusion Therapy



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## KEYWORDS

- Isolated hepatic perfusion • Hepatocellular carcinoma • Melanoma
- Colorectal cancer • Hepatic metastases • Regional therapies
- Percutaneous hepatic perfusion

## KEY POINTS

- Isolated hepatic perfusion (IHP) depends on the unique vascular structure of the liver to deliver cytotoxic chemotherapies to liver malignancies. Cytotoxic chemotherapy is delivered via the hepatic artery and extracted from the retrohepatic inferior vena cava to reduce systemic leakage.
- Hepatic perfusion has been used with oncologic efficacy in patients with metastatic ocular melanoma, hepatocellular carcinoma, and colorectal cancer liver metastases, among other histologies.
- Advances in techniques of chemosaturation with percutaneous hepatic perfusion may offer novel minimally invasive avenues of treating patients with metastatic disease.



Video content accompanies this article at <http://www.surgical.theclinics.com>

## INTRODUCTION

Although curative surgical resection is the optimal treatment of primary and metastatic malignancies of the liver, few patients are eligible because of the unique biology of liver disease. Regional therapies of the liver use the hepatic arterial-dominant supply of tumors to deliver high concentrations of chemotherapy, embolic particles, and radiation. Perfusion, as opposed to infusion, relies on the flow of cytotoxic therapy through the liver with extraction of the drug via the venous outflow. The anatomic reliance on the vascular supply of the liver is paramount in the ability to perform an isolated hepatic perfusion.

## SURGICAL TECHNIQUE AND SELECTION OF PATIENTS

Hepatic perfusion has been performed for numerous histologic subtypes, but the largest body of evidence exists for its use in patients with metastatic ocular

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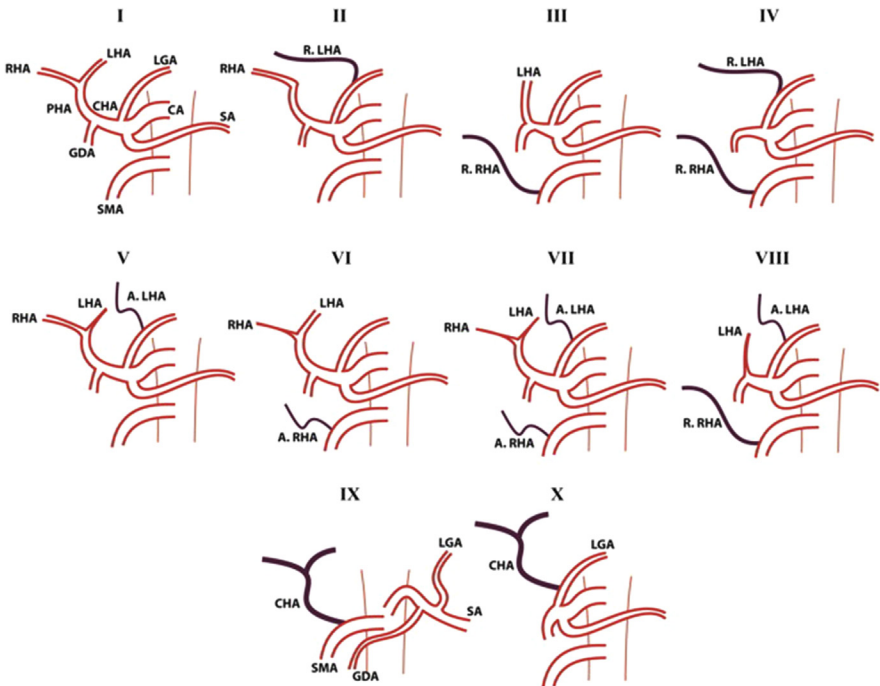
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melanoma, colorectal liver metastases, neuroendocrine tumors, and primary liver tumors including hepatocellular carcinoma and cholangiocarcinoma. There are three broad methods of performing a hepatic perfusion: (1) isolated hepatic perfusion (IHP), (2) percutaneous hepatic perfusion (PHP; a misnomer because it indicates chemosaturation), and (3) liver perfusional chemotherapy (which is primarily infusional).

### Selection of Patients

Before a liver perfusion, it is important to consider a few additional factors related to general oncologic surgical principles. Hepatic arterial anatomy can vary at least 20% of the time with the commonest anatomic variations shown in Fig. 1.

Although hepatic perfusion can be considered in patients with variants in anatomy, it is important to understand the hepatic arterial anatomy in great detail before attempting a perfusion. In addition, it is critically important to select patients who are robust enough to undergo the procedure and can tolerate any complications. Because up to 22% of patients can develop veno-occlusive disease and a few patients develop vanishing bile duct syndrome (more commonly seen with hepatic artery infusion [HAI] pumps), it is important to select patients with intact synthetic and excretory function of the liver.<sup>1,2</sup> Although pretreatment with chemotherapy is not a contraindication



**Fig. 1.** Michels classification of hepatic arterial anatomy. A. LHA, accessory left hepatic artery; A. RHA, accessory right hepatic artery; CA, celiac artery; CHA, common hepatic artery; GDA, gastroduodenal artery; LGA, left gastric artery; LHA, left hepatic artery; PHA, proper hepatic artery; R. LHA, replaced left hepatic artery; R. RHA, replaced right hepatic artery; RHA, right hepatic artery; SA, splenic artery; SMA, superior mesenteric artery. (From Caserta MP, Sakala M, Shen P, et al. Presurgical planning for hepatobiliary malignancies: clinical and imaging considerations. *Magn Reson Imaging Clin N Am* 2014;22(3):447–65; with permission.)

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