

### Endoscopic Demonstration of Malperfusion by Hepatic Artery Catheter

Regional chemotherapy via hepatic artery catheter (HAC) is a well recognized method of prolonging survival in patients with liver metastases from colorectal cancer. Response rates as high as 72% and a two-year survival of 66% have been reported (1) with two recent controlled trials showing significant survival advantage (2,3).

The ability to deliver high concentrations of chemotherapy locally without incurring systemic toxicity is thanks to the placement of a hepatic artery catheter through the gastroduodenal artery. One of the most serious complications of this treatment is peptic ulceration, sometimes of major upper gastrointestinal bleeding (4). Such gastric toxicity is often due to malperfusion of the stomach and/or duodenum.

The operative placement of HACs should always include injection of a dye to confirm perfusion of all the liver and absence of malperfusion. We routinely use methylene blue (methylene blue 1%, David Bull Laboratories) for this, but despite this malperfusion does sometimes become evident at a later date.

Our technique involves upper GI endoscopy and injection of methylene blue via the HAC port. After skin preparation the port is accessed with a Huber type needle and 5 ml of methylene blue are injected. The stomach is then heparin locked. The stomach and first two parts of the duodenum (Figure 1) are observed for a few minutes after injection. If malperfusion is present then the area of malperfusion will become intensely blue almost immediately, as shown in Figure 2.

Repeat gastroscopy and injection of methylene blue is performed after subsequent radiological embolization.

Anaphylactic reactions to methylene blue have been described but we have no intraoperative experience of this in over 450 patients.

We have found this to be a simple and safe technique for detecting malperfusion and currently use it in patients with abdominal symptoms during chemotherapy.

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**Figure 1:** Duodenum prior to injection of methylene blue.



**Figure 2:** The same area of duodenum after injection of methylene blue, showing a discrete area of blue staining.

#### References

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