

TACE and intra-arterial chemotherapy

Topic: Interventional Oncology

Presentation: 303.1

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Learning Objectives:

1. To describe patient selection for DEBIRI
2. To describe tips and tricks for injection of DEBIRI
3. To present imaging and clinical follow-up after DEBIRI

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Colorectal cancer kills 16,000 patients every year in the UK and 56,000 patients a year in the US. At the time of presentation of the primary tumour, 20% of patients will have colorectal liver metastases (CRLM) and a further 50% will develop CRLM. Partial liver resection in the absence of extra-hepatic disease has a 5 year survival of 26-47%, but curative resection depends on the location of the metastases relative to vital vascular structures, and the pattern of disease distribution within the liver. Despite surgical advances, at least 75% of patients with CRLM have either unresectable disease or have extra-hepatic disease, for which the only treatment options are systemic chemotherapy or best supportive care. For those patients with no extra-hepatic disease or liver dominant disease, image-guided ablative or catheter targeted therapies offer palliative debulking of hepatic disease, and may be curative. These procedures are now delivered in a minimally invasive fashion, using percutaneous or endovascular techniques, and performed mostly by interventional radiologists. The basis of using the hepatic arterial circulation to devascularise, or deliver chemotherapy to, CRLM relies on the fact that once the metastases have reached the hepatic sinusoids from the portal vein, they soon develop an arterial supply. They achieve this by parasitizing adjacent arterioles, and by inducing neo-vascularisation within their immediate environment by secreting angiogenic substances. Arterial devascularisation, therefore, adversely affects CRLM more than the normal liver, which still receives 80% of its blood supply from the portal vein. In order to overcome the problems of TACE where much of the cytotoxic component probably passes straight through the capillary bed, manufacturers of embolisation particles have loaded the cytotoxic drug into the particles prior to embolisation. The particles, or beads, absorb the drug and carry it to the tumour capillary bed, where it is released in a sustained and controlled fashion. The drug is then released into the surrounding tumour at a steady rate to ensure prolonged exposure and minimal systemic side-effects. The size of bead is selected to allow deep penetration into the CRLM, without the risk of

shunting into the systemic circulation. Unlike with HCC, shunting of beads is extremely unlikely, even with the smallest range of beads produced. The beads are mixed with the cytotoxic drug, usually in pharmacy, and left to stand for 1-2 hours. Drug is both absorbed osmotically and bound electrically, depending on the charge. As the beads absorb over 90% of the cytotoxic drug during this time, it is possible to administer selected doses of drug to the liver far more accurately than with conventional TACE. Also, because the beads have a uniform size and are less likely to aggregate, the dose will end up in the tumour bed rather than stagnating in the supplying vessel distant from the tumour. 4-5 French (F) catheters are used to access the celiac axis, common hepatic artery, or right or left hepatic arteries, but more peripheral catheterisation requires passage of a microcatheter (2-3 F outer diameter) in a co-axial fashion through the larger catheter. The microcatheter has its own hydrophilic wire to enable selective catheterisation. Although a 4F catheter can often be advanced well into a lobar or even segmental artery, it is likely to fill the lumen and severely affect the laminar flow of blood. This could adversely affect distribution of injected embolic material. Arterial spasm or dissection, caused by the larger catheter, may even prevent further treatment on that occasion. Identifying CRLM on arteriography can be difficult because, despite their increased arterial supply relative to normal liver, they usually only show enhancement peripherally and this may be quite faint on fluoroscopy. It may be necessary to pass the catheter close to the supplying branch before the lesion is well seen. However, it may not be necessary to identify the feeding vessel supplying each and every metastasis if there are multiple lesions, and it is reasonable practice to embolise a whole segment or lobe in this situation. Because the normal liver receives most of its blood supply from the portal vein, it tolerates complete loss of arterial flow, whereas the CRLM are affected far more by the cessation of the arterial supply. Confirmation of portal vein patency has been regarded as mandatory prior to hepatic arterial embolisation to avoid catastrophic hepatic infarction. The alternative approaches to treating colorectal liver metastases are super-selective, segmental or lobar. Some centres treat the whole lobe regardless of the number of metastases while others prefer to treat individual lesions more selectively. Our preference is for selective lesion treatment or segmental treatment. To overcome the problems of correctly identifying the appropriate feeding vessels, we have been using intra-arterial contrast ultrasound prior to injection of the irinotecan drug-eluting beads. This allows simulation of which parts of the tumour will be treated from individual vessels when the beads are injected. If parts of the tumour do not enhance during contrast injection, then it is important to look for extra-hepatic parasitized vessels. Doses ranging between 100 and 200 mg irinotecan are administered in 100-300 micron diameter beads. Our early experience was that many patients had severe pain immediately following treatment but with refinement of our pharmacological protocol, this has improved considerably. Most patients can be discharged the following day. Patients have a CT scan and clinic appointment 4 weeks later when further treatment is planned. Our experience of using irinotecan beads in patients with colorectal liver metastases will be presented and, along with a review of the literature, guidance will be offered for the most successful way to manage these patients and where this treatment may fit into management paradigms for CRLM.