

Case presentation

Trans-Arterial ChemoEmbolization with Intra-Arterial Chemotherapy

(TACE-IAC)

درتومورهای خلف صفاقی کودکان
دکتر بابک عبدالکریمی هماتولوژیست آنکولوژیست کودکان
دکتر آرش امین اینترونشن کاردیولوژیست و فلوشیپ کاردیاک ایمیجینگ



Case 1:

- بیمار دختر بچه 2 ساله باتوده نوروبلاستوم خلف صفاقی بزرگ و غیر قابل جراحی به دلیل
- aort encasement که به 14 جلسه شیمی درمانی conventional ,salvage جواب نداده بود و بارضایت خانواده از فیلد درمان give up شد. بعد از یک وقفه حدود 2 سال تحت 2 جلسه TACE-IAC و جراحی compelet resection قرار گرفت. پاتولوژی نهایی در اثر transformation تومور گانگلیونوروما گزارش شد.

Case 2:

- دختر 4 ساله باتوده نوروبلاستوم خلف صفاقی بزرگ و غیر قابل جراحی به دلیل
- aort encasement که به 16 جلسه شیمی درمانی conventional ,salvage و یک نوبت جراحی partial resection جواب نداده بود تحت 2 جلسه TACE-IAC و جراحی complete resection قرار گرفت. پاتولوژی نهایی تومور نوروبلاستوما گزارش شد که برای MIBG therapy و hsct اتولوگ اعزام شد .

Case 3:

- پسر بچه 3 ساله باتوده نور و بلاستوم خلف صفاقی بزرگ در مجاورت نخاع توراسیک و باگسترش به شکم و لگن و غیر قابل جراحی به دلیل
- aort encasement که به 16 جلسه شیمی درمانی conventional, salvage جواب نداده بود و تحت 2 جلسه TACE-IAC و جراحی compelet resection قرار گرفت. به دلیل مثبت بودن MIBG بیمار و وجود متاستاز استخوانی تحت درمان مجدد بارژیم شیمی درمانی SALVAGE قرار گرفت و متاسفانه در این بین مجدد تومور مجاور نخاع توراسیک رشد کرد و کودک دچار درد شدید اندامها و پاراپلژی شد. مجدداً نوبت دیگر TACE-IAC برای تومور توراسیک انجام شد و برای مشاوره رادیوتراپی اعزام شد که جواب مثبت جهت رادیوتراپی داده نشد. در حال حاضر بیمار روی شیمی درمانی مترونومیک میباشد تا جلسه چهارم TACE-IAC انجام شود.

Intra-arterial chemotherapy with chemoembolization

- **Indication:** unresectable tumor change to resectable tumor
- **IAC:** chemotherapy agents transport to tumor via feeding artery of tumor
- **TACE:** occlusion of feeding artery via liposomal products(hepaspher)
-

TACE-IAC

درتومورهای بالغین در سطح دنیا

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CASE REPORT

WILEY

Complete response in a patient with stage IV adrenocortical carcinoma treated with adjuvant trans-catheter arterial chemo-embolization (TACE)

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Abstract

Adrenocortical carcinoma is a rare cancer, with estimate population incidence of 0.7–2.0 cases per 1 million each year. It also carries poor prognosis with estimated 5-year survival of less than 15% of those with metastatic disease and has a poor response to cytotoxic treatment. A randomized controlled trial published in 2012 by Fassnacht et al. demonstrated improved progression-free survival with first-line etoposide-doxorubicin-cisplatin-mitotane (EDP-M) compared to first-line streptozocin-mitotane in patients with stage III–IV disease.

We report a case of a 25-year-old female diagnosed with adrenocortical carcinoma with liver and lung metastases treated with adjuvant EDP-M chemotherapy. During her treatment, the patient experienced ongoing significant liver-associated burden of disease, which prompted a trial of trans-hepatic arterial chemoembolization with doxorubicin and mitomycin. The patient subsequently experienced complete remission of disease at 18 months with no fludeoxyglucose (FDG) avid lesions on PET/CT.

KEYWORDS

adrenocortical, carcinoma, TACE

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Clinical Study

Intra-Arterial Chemotherapy with Doxorubicin and Cisplatin Is Effective for Advanced Hepatocellular Cell Carcinoma

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Advanced hepatocellular carcinoma (HCC) remains a fatal disease even in the era of targeted therapies. Intra-arterial chemotherapy (IAC) can provide therapeutic benefits for patients with locally advanced HCC who are not eligible for local therapies or are refractory to targeted therapies. The aim of this retrospective study was to analyze the effect of IAC with cisplatin and doxorubicin on advanced HCC. **Methods.** Patients with advanced HCC who were not eligible for local therapies or were refractory to sorafenib received doxorubicin (50 mg/m²) and cisplatin (50 mg/m²) infusions into the liver via the transhepatic artery. Between January 2005 and December 2011, a total of 50 patients with advanced HCC received this treatment regimen. The overall response rate (ORR) was 22% in all treated patients. In patients who received at least 2 cycles of IAC, the ORR was 36.7%, and the disease control rate was 70%. Survival rate differed significantly between patients who received only one cycle of IAC (group I) and those who received several cycles (group II). The median progression-free survival was 1.3 months and 5.8 months in groups I and II, respectively ($P < 0.0001$). The median overall survival was 8.3 months for all patients and was 3.1 months and 12.0 months in groups I and II, respectively ($P < 0.0001$). The most common toxicity was alopecia. Four patients developed grade 3 or 4 leukopenia. Worsening of liver function, nausea, and vomiting were uncommon side effects. This study demonstrated clinical efficacy and tolerable side effects of repeated IAC with doxorubicin and cisplatin in advanced HCC. Our regimen can be an alternative choice for patients with adequate liver function who do not want to receive continuous infusion of IAC.

TACE-IAC

درتومورهای کودکان در دنیا

Transarterial chemoembolization in children to treat unresectable hepatocellular carcinoma

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Children with unresectable HCC have a dismal prognosis and few approved treatment options. TACE is an effective treatment option for adults with HCC, but experience in children is very limited. Retrospective analysis was performed of 8 patients aged 4-17 years (4 male, mean 12.5 years) who underwent TACE for unresectable HCC. Response to TACE was evaluated by change in AFP, RECIST and tumor volume, PRETEXT, and transplantation eligibility by UCSF and Milan criteria. Post-procedure mean follow-up was 8.2 years. Mean overall change in tumor volume for the 8 patients was 51%. Percent change in AFP ranged from a decrease of 100% to an increase of 89.3%, with a mean change of -49.6%. Two patients did not undergo resection or transplantation and died of progressive disease. Six patients underwent orthotopic liver transplantation with mean first TACE-to-transplant interval of 141 days (range 11-514). Following transplantation, 5 patients were alive at the end of the follow-up period and one died of recurrent disease. Based on our initial experience, TACE for children with unresectable HCC appears to be a safe and effective method for managing hepatic tumor burden and for downstaging and bridging to liver transplantation.

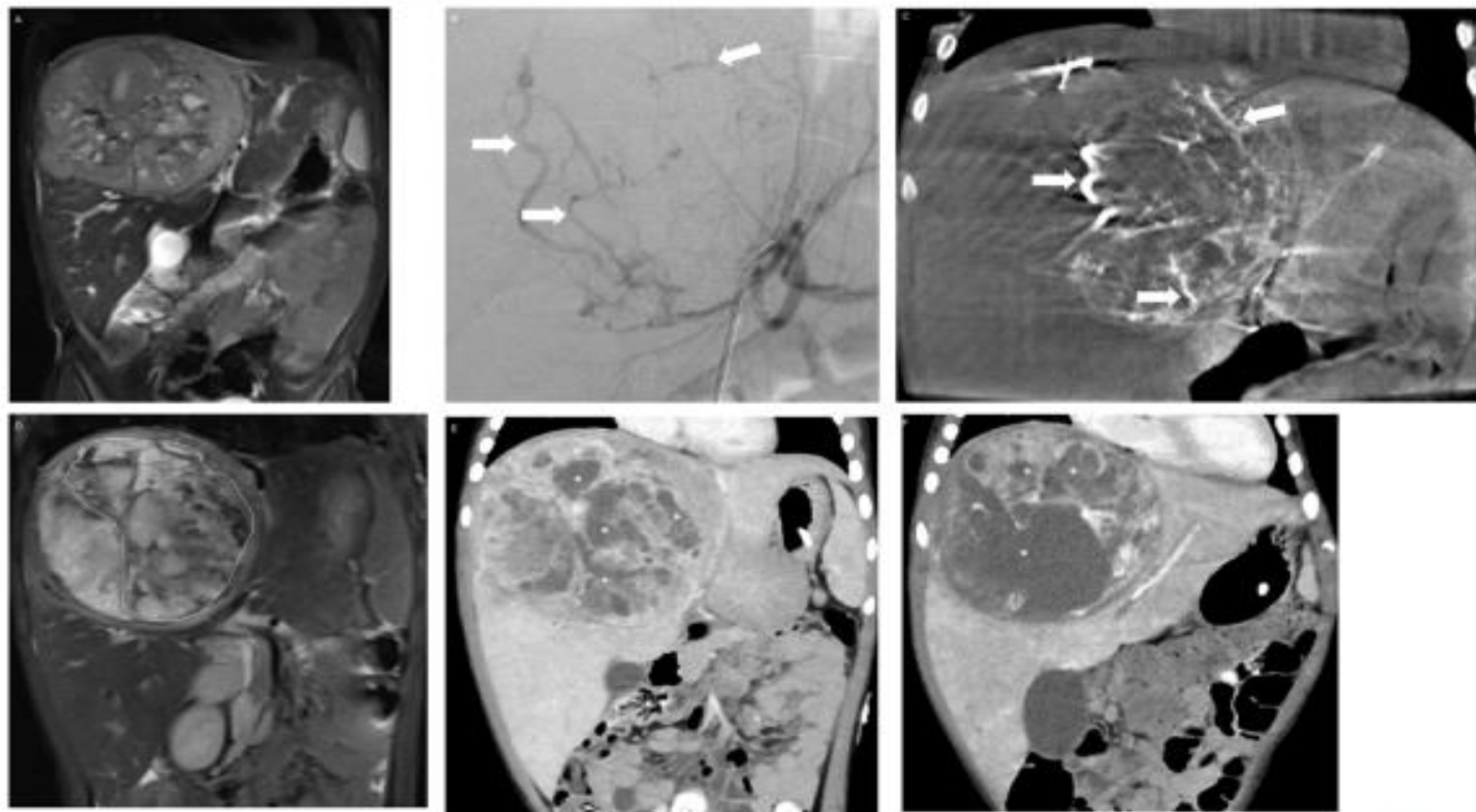


Fig. 1 T2- weighted fat saturated coronal (a) MR image demonstrating a large hepatocellular carcinoma in a 2-year-old male patient which was unresponsive to systemic chemotherapy. b Angiography obtained during transcatheter arterial chemoembolization demonstrating several hepatic arterial branches encasing and supplying the tumor (arrows). These feeders were injected with 30 mg of doxorubicin emulsified with lipiodol followed by embolization with 150–250- μ m poly vinyl alcohol particles confirmed on cone-beam computed tomography (c) obtained post embolization demonstrating the radio-opaque embolization beads in the tumor bed (arrows). d Post embolization T1- weighted post contrast coronal MRI obtained 3 weeks later demonstrating heterogeneous necrotic area (dotted line) within the tumor. Coronal computed tomography obtained 3 weeks (e) after the first TACE procedure and 3 weeks (f) after the second TACE procedure demonstrating increasing necrotic areas within the tumor (asterisk). The patient underwent a successful liver transplant 6 weeks later

TACE-IAC

در تومورهای کودکان در ایران

1- یک مورد تومور ویلمز در بیمارستان رسول اکرم تهران

2- یک مورد بیمارستان مفید (نوروبلاستوم)

Review Article

The Role of Intraarterial Chemotherapy in the Management of Retinoblastoma

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Introduction. Retinoblastoma is the most common primary intraocular neoplasm in children. With the advances in medicine, the armamentarium of available treatment modalities has grown. Intraarterial chemotherapy is a relatively new treatment method with promising outcomes. The purpose of this literature review is to evaluate its role in the management of retinoblastoma. **Methods.** A systematic online search was conducted using Ovid Embase and Ovid Medline. The final results included 23 studies. The studies were published between 2011 and 2019. The studies evaluated the technical success rate of IAC, globe salvage rate, and ocular and systemic complications, as well as the occurrence of deaths, metastasis, and secondary neoplasms. In total, 1827 eyes with retinoblastoma were analysed. The follow-up was between 0 and 252 months. **Results.** Overall globe retention rate ranged from 30% to 100%. Sixteen out of 23 studies reported ocular salvage between 60 and 80%. Eyelid oedema and erythema were the most commonly reported ocular complications following IAC. The most common systemic complications included nausea, vomiting, and neutropenia. Metastases and deaths were reported in 6 out of 23 studies. Three studies reported the development of secondary neoplasms. The technical success rate of IAC procedure ranged from 91% to 100%. **Discussion.** The studies have shown that IAC is a safe and effective treatment for advanced retinoblastoma, especially group D. It allows to save the globe without compromising patients' survival. Local and systemic complications are acceptable. The role of IAC in less advanced tumours is yet to be established. Future work should focus on conducting larger prospective studies with longer follow-up. Multiple novel therapies for the management of retinoblastoma are currently being tested, including angiogenic inhibitors and targeted agents. The results seem to be promising. Future advances require a further in-depth understanding of unique genetics of retinoblastoma and complex interactions between tumour cells and their microenvironment.

FEATURE ARTICLE

Intra-Arterial Chemotherapy for Limb Preservation in Patients With Osteosarcoma: Nursing Implications

Ellyn Matthews, PhD, RN, AOCN®, CRNI, Katie Snell, RN, BSN, OCN®, and Heather Coats, RN, MS, APN, OCN®

Osteosarcoma is an aggressive tumor found in children and young adults, originating primarily in the legs or arms. The high-grade tumor grows in a circular, ball-like mass in the bone tissue. Before the 1970s and the advent of chemotherapy use in osteosarcoma, treatment consisted solely of amputation. More recently, a preoperative regimen of intra-arterial (IA) cisplatin and infusional doxorubicin with limb-sparing procedures has provided an effective treatment option and improved survival for many patients with osteosarcoma. IA chemotherapy is administered through a small, temporary, external catheter that rests in the arterial vessel that supplies the tumor. The primary advantage of IA chemotherapy administration is the delivery of a higher chemotherapy concentration directly to the tumor site. Nursing management of patients with IA chemotherapy requires knowledge of treatment side effects and procedure-related assessments. Further implications for practice include instructing patients and families before and after the insertion of the IA line and giving discharge and long-term follow-up education. Oncology nurses are well positioned to assist children and young adult patients through difficulties with adjustment after treatment is completed and a response has been achieved, owing to advanced communication skills and knowledge of developmental stages and survivorship issues.

استخراج پروتوکل و مراحل انجام پروسیجر:

پروتکل شیمی درمانی انترونشیونال رژیونال

Interventional chemotherapy_+TACE:

(Transarterial Chemoembolization)

Patient name:

Procedure type: intra-arterial chemotherapy_+chemoembolization

Tumor type:

Procedure description:

Experts team(physicians):

Side effects:

Precautions:

Follow up:



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Drug preparation



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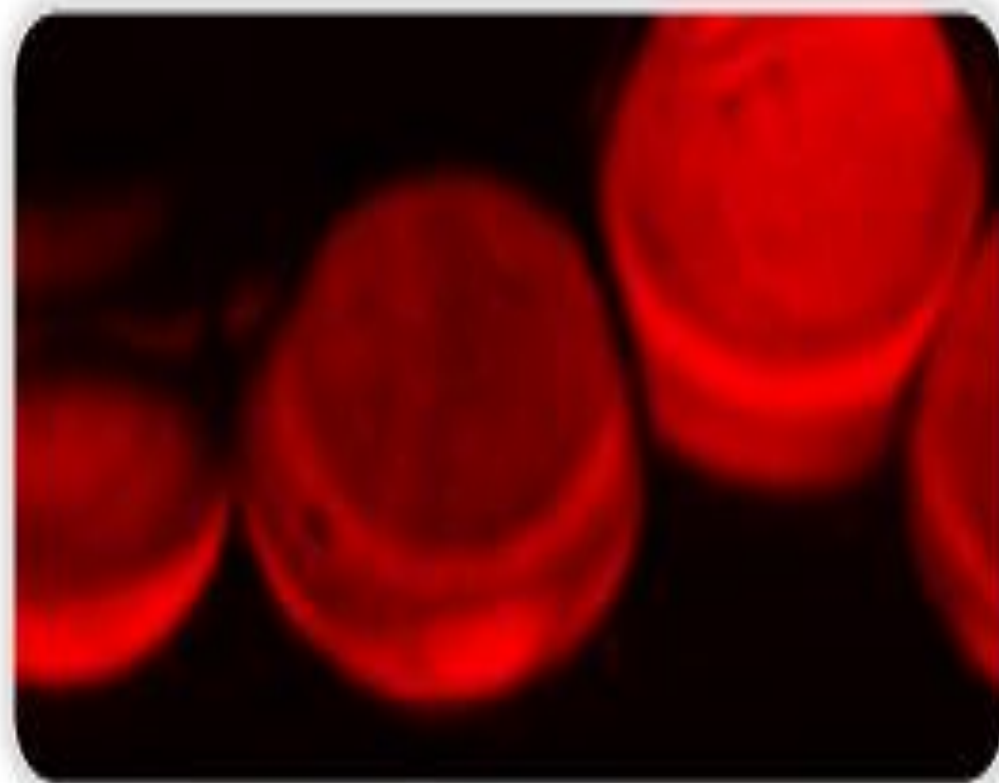
FAST LOADING

HepaSphere, also known as superabsorbent polymer (SAP) microsphere, is the only microsphere that:

- Is packaged dry and ready for reconstitution
- Works like a sponge and loads the drug throughout the microsphere
- Loads $\geq 90\%$ of doxorubicin (liquid or powder prepared with normal saline) in < 15 minutes*
- Has a 15-day storage and stability lifetime**
- Once reconstituted, swells to approximately 4x the size printed on the product label
- Can absorb fluids up to 64x its dry-state volume

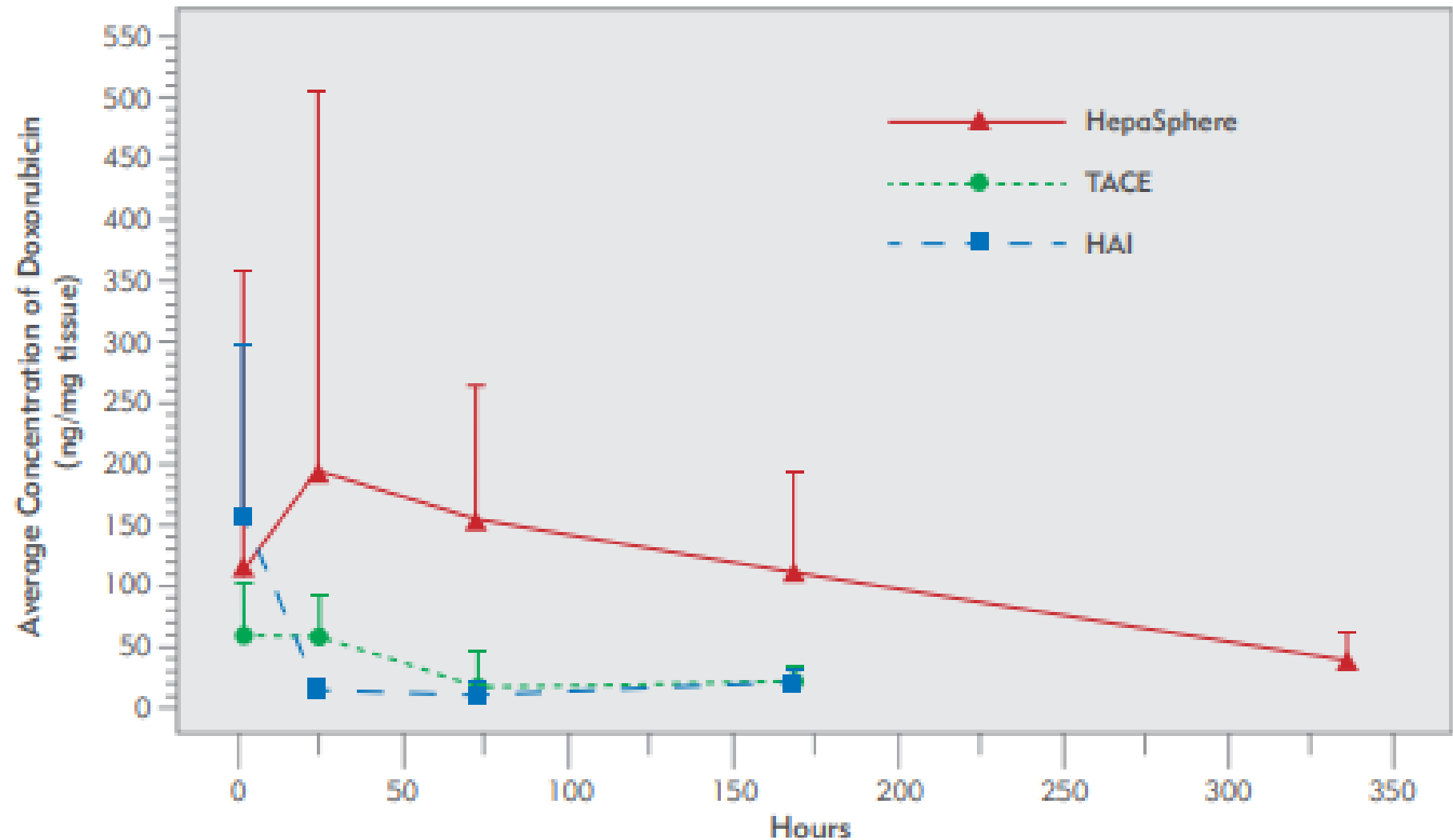
THOROUGH LOADING & SUSTAINED ELUTION

Doxorubicin is loaded throughout HepaSphere
Microspheres and is retained by an ionic bond, providing
a sustained release over 14 days²; with peak intratumoral
concentration of doxorubicin observed at 3 days.³



*Photomicrograph of cross sections of HepaSphere
Microspheres loaded with doxorubicin (original magnification,
20x). The red color indicates the presence of doxorubicin,
which is loaded throughout the microsphere. Data on file.*

DELIVER MORE
DRUG DIRECTLY
TO THE TUMOR
FOR LONGER²



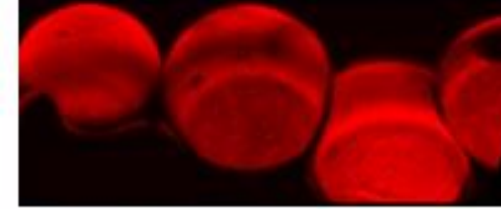
In the hepatic arterial infusion (HAI) and transarterial chemoembolization (TACE) groups, intratumoral doxorubicin levels declined to negligible levels at 1 and 3 days after treatment, while in the HepaSphere group, the intratumoral doxorubicin level was still detectable at 14 days after treatment and was higher than that in the other groups at 1, 3, and 7 days.

فواید استفاده از هیاسفر و شیمی درمانی داخل شریانی

Compelling Advantages for Drug-Eluting TACE

ADVANTAGE:

Drug loading throughout the entire spherical volume

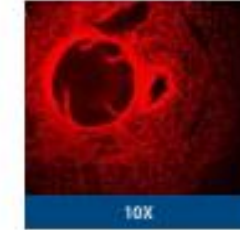


Consistent loading throughout the sphere offers potential for optimal drug loading and delivery.

Cross section of HepaSphere Microspheres loaded with doxorubicin originally taken at 20x magnification. The red color indicates the presence of doxorubicin. Data on file at BioSphere Medical.

ADVANTAGE:

Penetration of doxorubicin into surrounding tissue

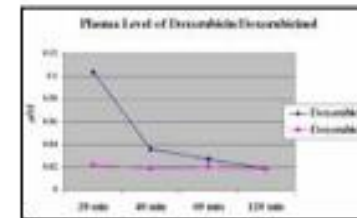


With kind permission from Springer Science and Business Media

In a VX-2 animal model, HepaSphere 50-100µm Microspheres eluted doxorubicin to a distance of up to 1600 microns into the surrounding tumor tissue assessed 24 hours after delivery¹.

ADVANTAGE:

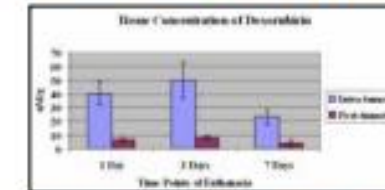
Low systemic drug exposure of doxorubicin



Plasma concentration of doxorubicin and doxorubicinol of HepaSphere loaded microspheres in a VX-2 model²

ADVANTAGE:

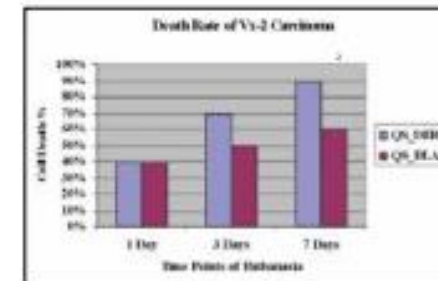
Sustains greater tumoral concentration of doxorubicin within tumor vs. outside of tumor



Intra-tumoral/peri-tumoral concentration of doxorubicin loaded HepaSphere Microspheres in a VX-2 model²

ADVANTAGE:

Effective tumor cell "kill" rate vs. bland embolization



ADVANTAGE:

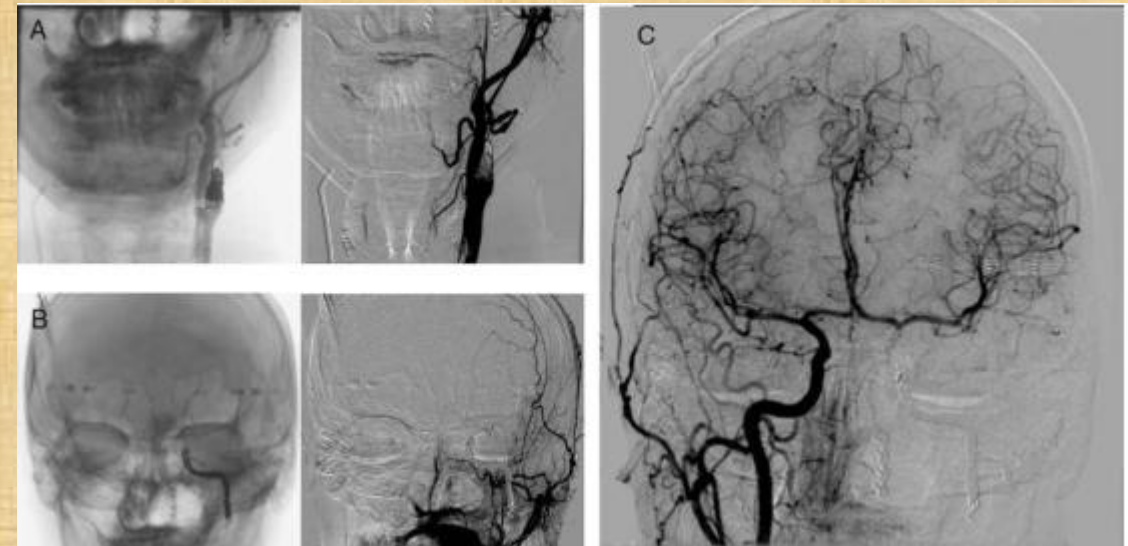
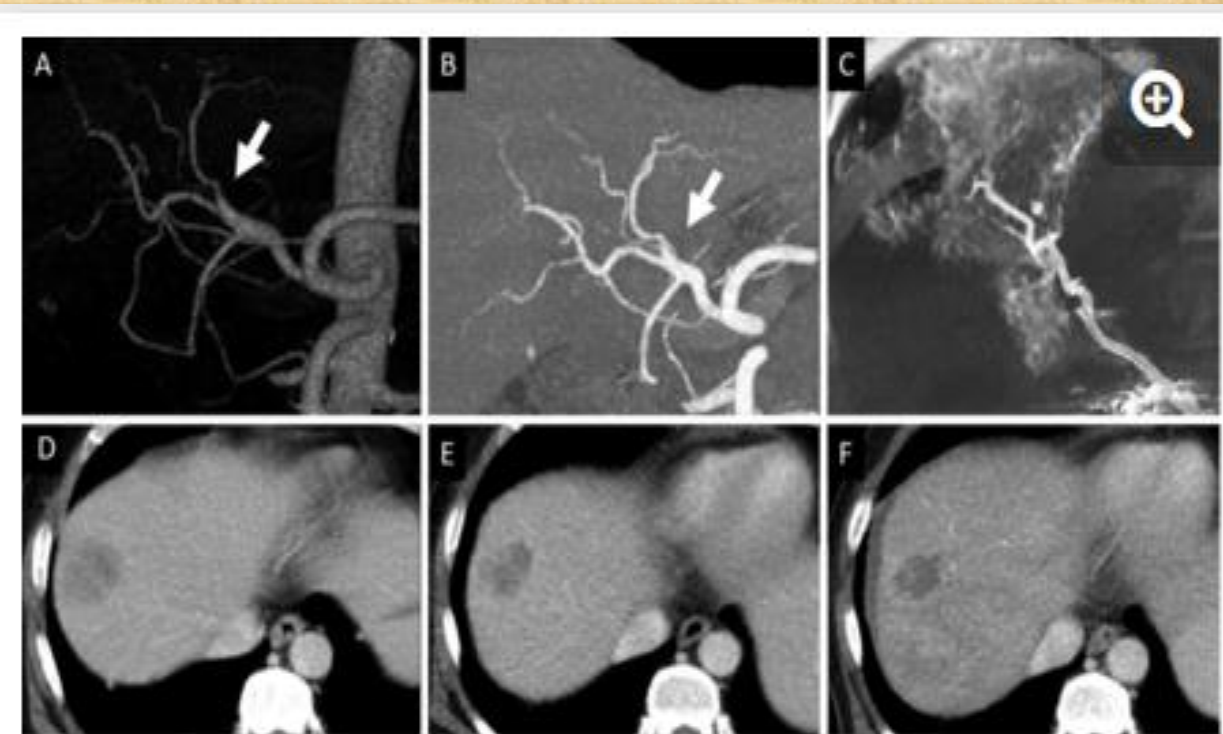
Encouraging initial clinical experience with HepaSphere Microspheres in HCC Patients³



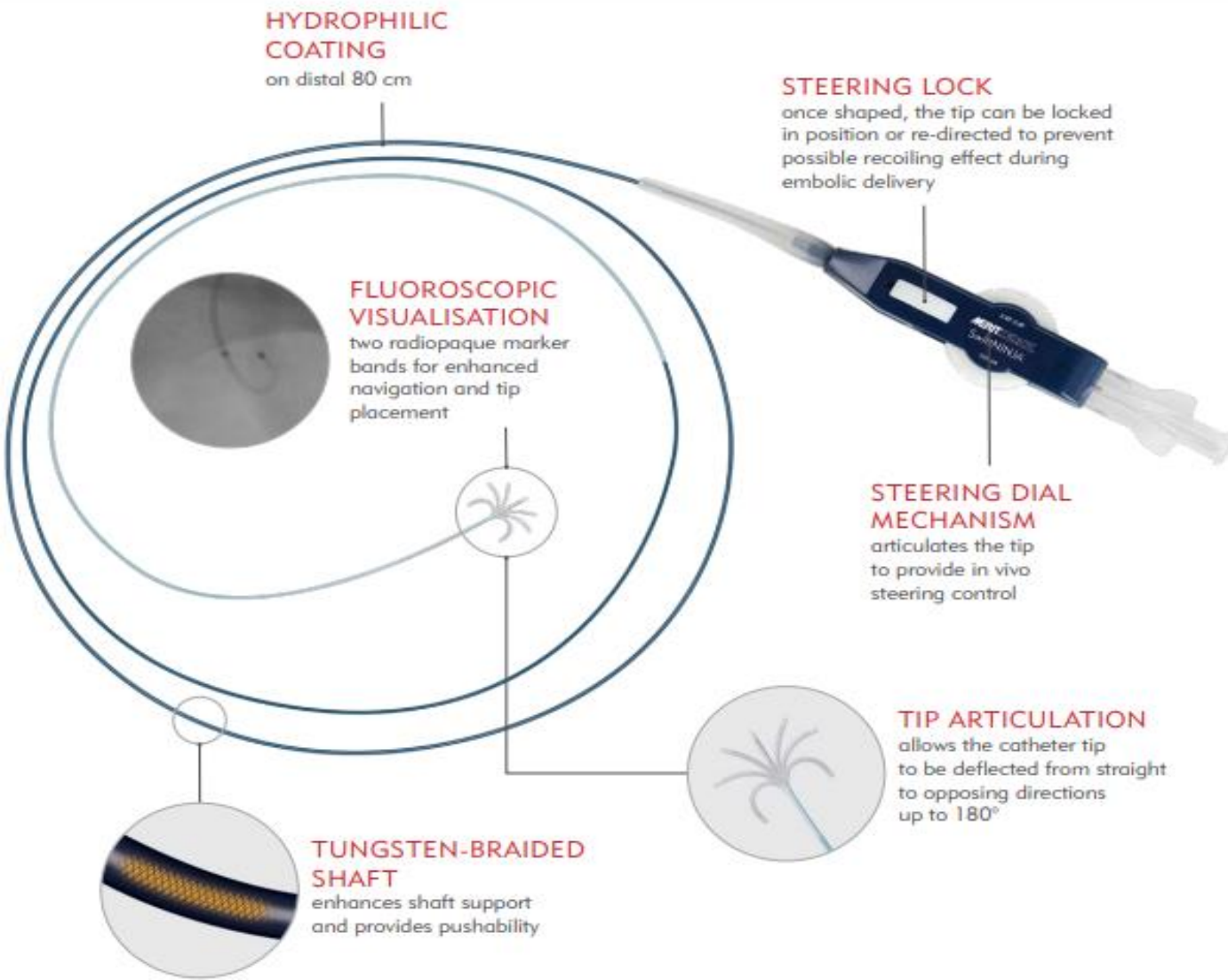
N	50, Child-Pugh A/B
Loading	50 mg
# treatments	Up to 3
Follow-up interval	6 months
Objective Response	72.4%

Note: Not controlled, not randomized, 4 sites, doxorubicin or epirubicin

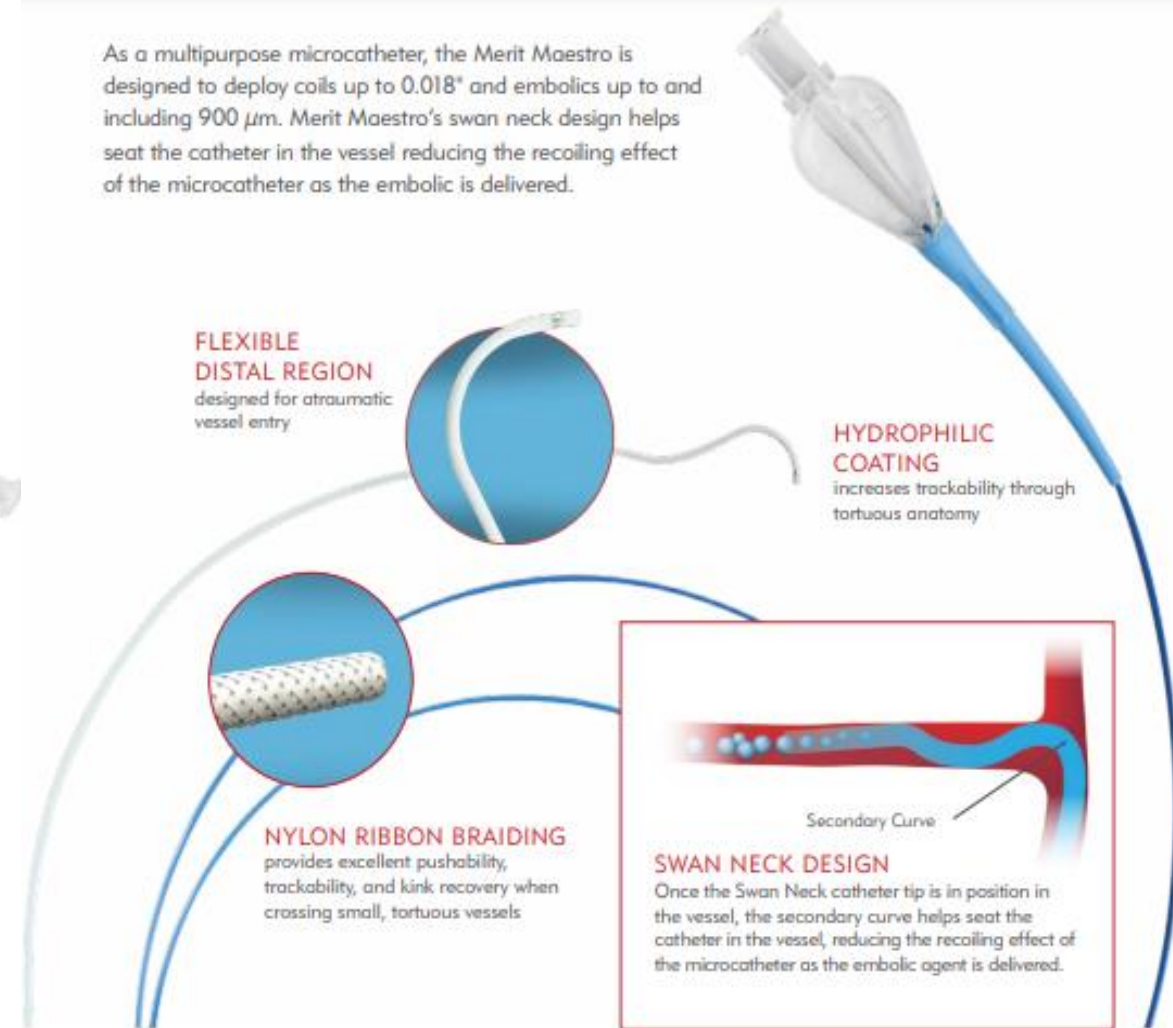
Arterial mapping study & pretreatment planing:



Superselective angiography:

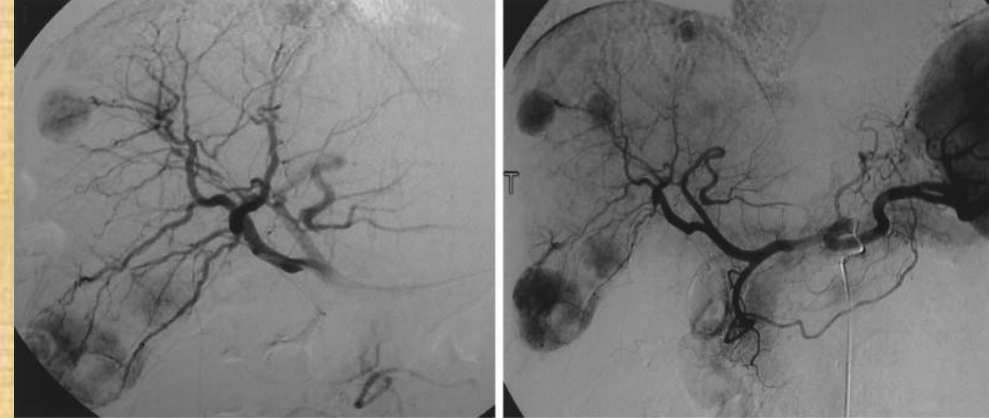


As a multipurpose microcatheter, the Merit Maestro is designed to deploy coils up to 0.018" and embolics up to and including 900 μm . Merit Maestro's swan neck design helps seat the catheter in the vessel reducing the recoiling effect of the microcatheter as the embolic is delivered.



CATHETER COMPATIBILITY:



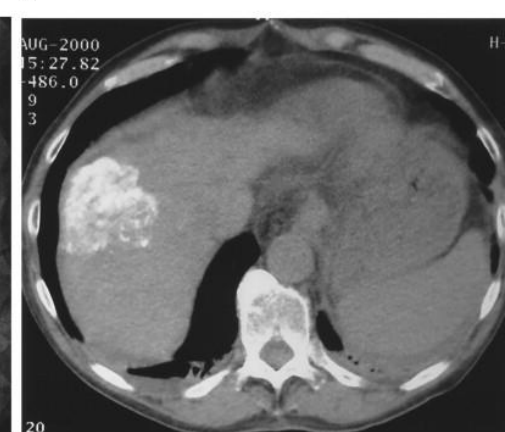


a.

b.



c.



d.

ملزومات انجام کار:

1. pre-treatment WBC > 3000/ul, Plt > 120,000/nl and Hb > 9.5 gm/dl. Patients' T.Bil and Cr be normal.
- 2. 3-6 weekly intervals up to 12 cycles,
- 3. **Adriamycin** and **Cisplatin/Carboplatin**
- 4. antiemetic (granisetron 3-8 mg) & proton pump inhibitor(PPI)
- 5. (filgrastim) at a dose of 5 ug/kg/d from day 10 after chemotherapy, for 6 consecutive days
- 6. Modification of pain & sedation(ketamin-antispasmodic)
- 7. IV hydration the night before the procedure
- 8. Foley catheter the morning of IA line placement
- 9. before cisplatin administration, premedications, including lorazepam, furosemide, dexamethasone
- 10. bed rest for an additional 4 hours. When bed rest is no longer necessary, the Foley catheter can be removed; IV fluid continues for another 24 hours; intake and output are
- monitored strictly.

برنامه آینده:

Unresectable bone tumors:

1-pelvic bone tumors

2-unresectable limb bone tumor

New strategy for prevention of limb amputation

برنامه درازمدت:

TACE in ***brain tumors***(chroid plexus tumo,meningioma)