

Y90 Radioembolization of Metastatic Neuroendocrine Carcinoma

Dr. Amol Mujoomdar, MD FRCPC

Associate Professor of Radiology and Oncology

Western University

CNETS National NET Patient Conference



Disclosures

- I have received speaker honorarium from Cook Medical, Covidien and BTG in the last five years
- I have proctored other physicians for LivaNova Inc. in the last year
- I have participated in an advisory board for BTG for Y90 (Therasphere) in the last five years

Full Disclosure:

Y90 is not currently funded in
Ontario

Unfortunately, I cannot accept patients
for referral....

I am working on it with CCO, but change
is slow

Objectives:

- What is the role of the diagnostic and interventional radiologist on the NET team?
- What are the different transarterial therapies for metastatic NET?
 - Bland embolization, chemoembolization and Y90
- What is Y90, how is it delivered and how does it work?
- What is the patient experience?
- Risks, side effects?
- How does it compare to TAE and TACE?

Role of Radiologist

- Physician who interprets diagnostic imaging (US, CT, MRI)
 - Diagnostic radiologist
- Physician who performs “image-guided” procedures with US, CT or live x-rays (fluoroscopy)
 - Interventional Radiologist

What kinds of procedures are performed in IR?

- Image-guided biopsies (liver biopsy, etc) with ultrasound or CT guidance
- Thermal ablation of liver tumours (RFA, microwave)
- Transarterial therapies for liver metastases
 - Chemoembo, bland embo or Y90
- Venous access procedures to deliver chemotherapy (PICC lines, Ports, etc)

LHSC NET Radiology Team:



Victoria Hospital IR Team: IR physicians, Medical Radiation Technologists, IR Nurses, Receptionists and IR Facilitator

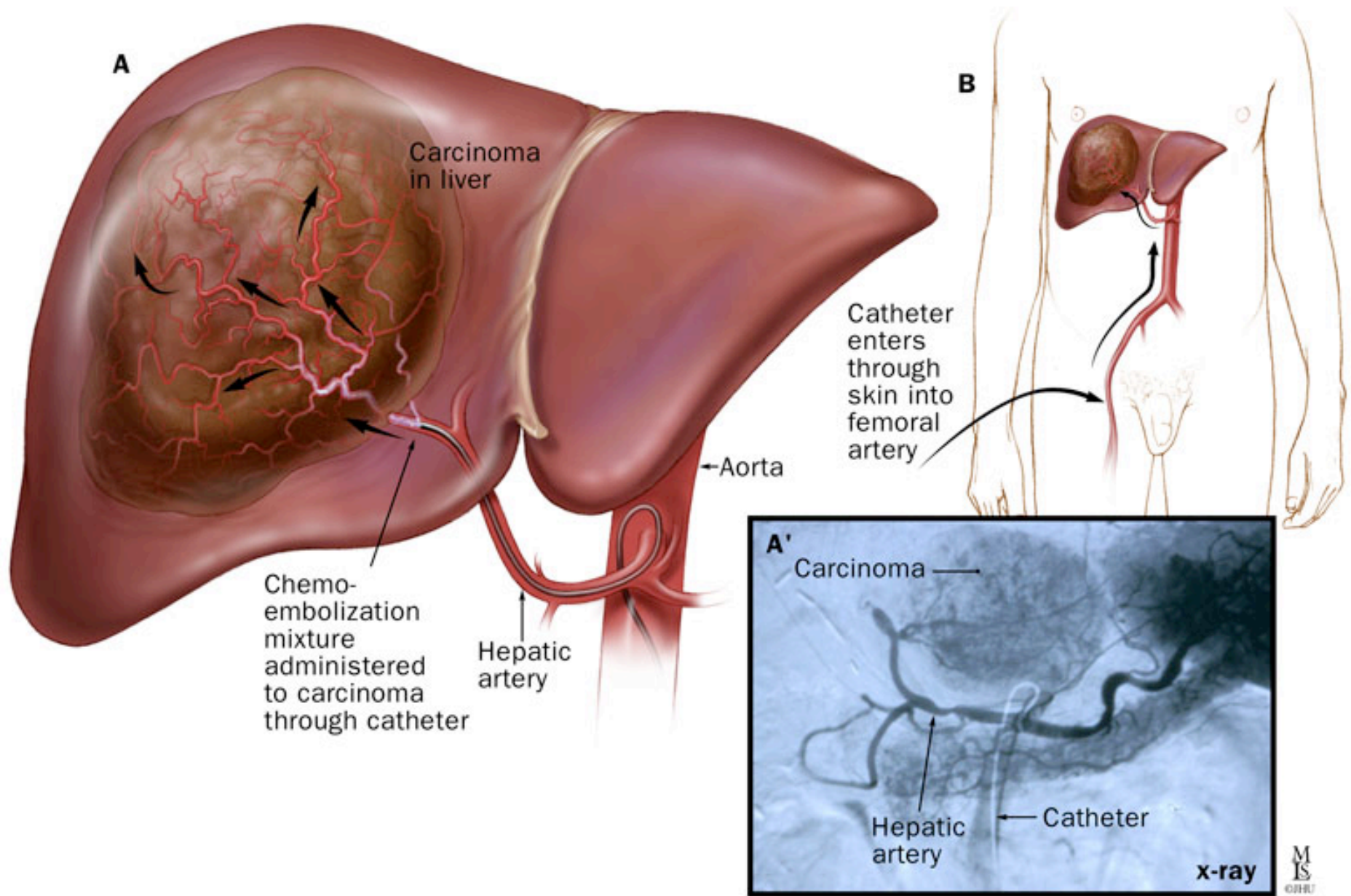


It takes a village!!!

What are the different transarterial therapies for metastatic NET?

Chemoembolization and bland embolization

- Treatment that involves liver angiography, and direct injection of *bland particles* (plastic shavings) or *chemotherapy* into the liver arteries (and tumour arteries that feed the beast)
 - Chemotherapy usually *doxorubicin* (mixed with oily substance-lipiodol, saline and x-ray contrast)
 - Chemoembo is followed by bland embo
- Requires admission to hospital the day prior for IV hydration, premedication and preparation
- Procedure performed in IR suite with live x-rays



How does that work on tumours?

- Bland embolization works by starving the tumours of their blood supply (choking effect)
- Chemoembolization works by direct toxic effect of chemotherapy to tumour cells and choking the blood supply (1-2 punch effect)
- Which is better????
 - Scientific literature shows it is a wash-both equally effective, trend for chemoembo for pNET
 - We do chemoembolization at our centre because of our local experience and preference

What about Y90? (I thought I came to
hear about Y90???)

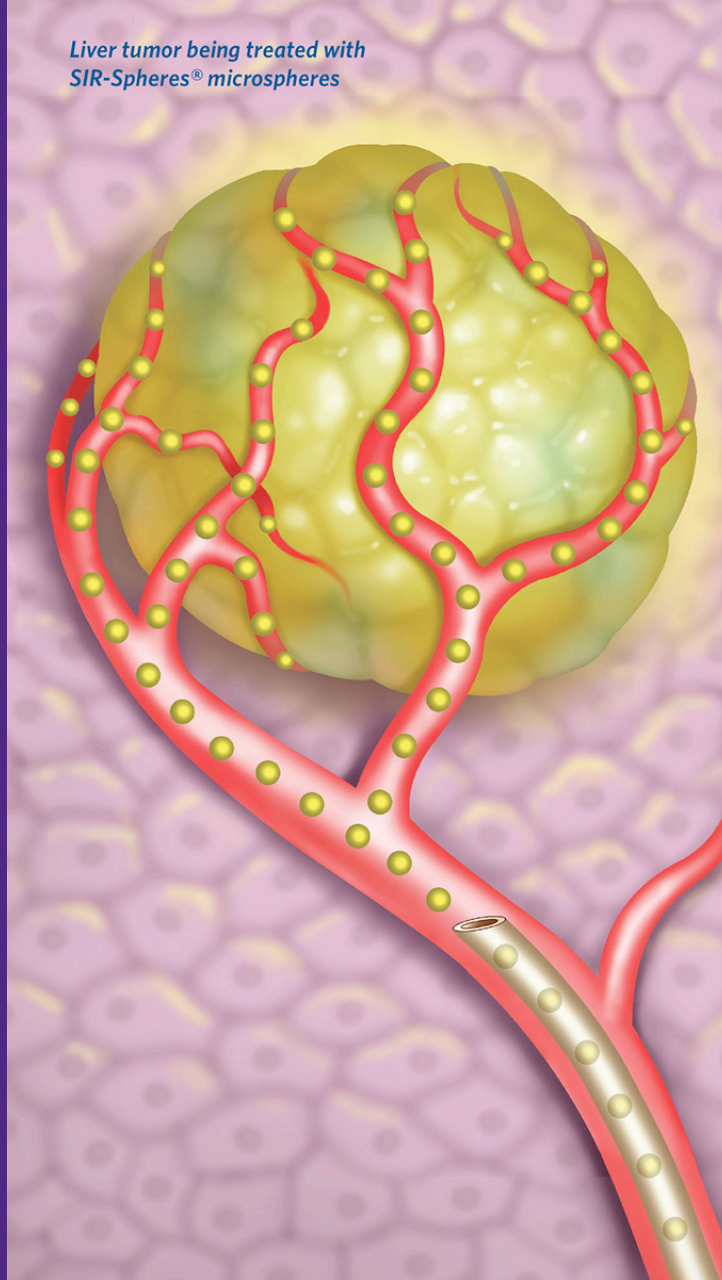
Rationale for Y90:

- Radiation is lethal to neoplastic tissues if sufficient dose
 - However, normal liver is sensitive to radiation and can be lethal
- Y90 bearing microspheres (unlike external radiation) are millions of high dose point sources of radiation that preferentially localize in tumours, while sparing the normal liver
 - Therefore can deliver a high dose of radiation

Y90 radioembolization

- Y90 is delivered by small glass or resin microspheres (on the order of millions)
- Y90 spheres emit high energy beta rays with an average penetration of 2.5mm with a maximum range of 11mm
- Half life is 64.2 hours (2.67 days), decays to stable zirconium 90
- Health Canada approved (1991) and FDA approved for treatment of hepatic neoplasia

*Liver tumor being treated with
SIR-Spheres® microspheres*



What is the patient experience?

- Similar to bland or chemoembolization procedure
- Outpatient procedures (no admission required)
- Two or three parts to the Y90 treatment:
 1. Planning liver angiogram
 - Liver angiogram and nuclear medicine lung-shunt study
 - Information from study used to calculate dose
 2. Y90 administration (1-2 weeks after planning angio)
 - Liver angiogram and delivery of Y90 particles
- Recover for 2-3 hours and go home!

What are the risks?

- Similar to chemoembolization:
 - Access related (bleeding, damage to blood vessels)
 - Infection (lower with Y90)
 - GI ulcers (rare with good technique, but devastating)
 - Liver failure (rare in NET with good patient selection)
 - Radiation induced liver disease (nausea, vomiting and “hepatitis)

What are the side effects?

- Post embolization syndrome (mild flu like symptoms: fatigue, nausea, vomiting, low grade fever)
- Most people feel fatigue
- Pain is less common
- There are some radiation related precautions (7 days):
 - Cannot sleep in the same bed as partner
 - Cannot sit next to someone for >2 hours
 - No close contact with children and pregnant women

How does it compare to bland or chemoembolization?

- Similar survival benefit as TACE and bland embolization
- No head to head trial (one ongoing from UPENN)
- Advantages primarily in side effect profile
 - Generally painless procedure
 - Other than fatigue, side effects are few
- Disadvantages:
 - COST
 - Can only do once or twice given the radiation threshold of the liver

How do we determine who is a candidate for what therapy?

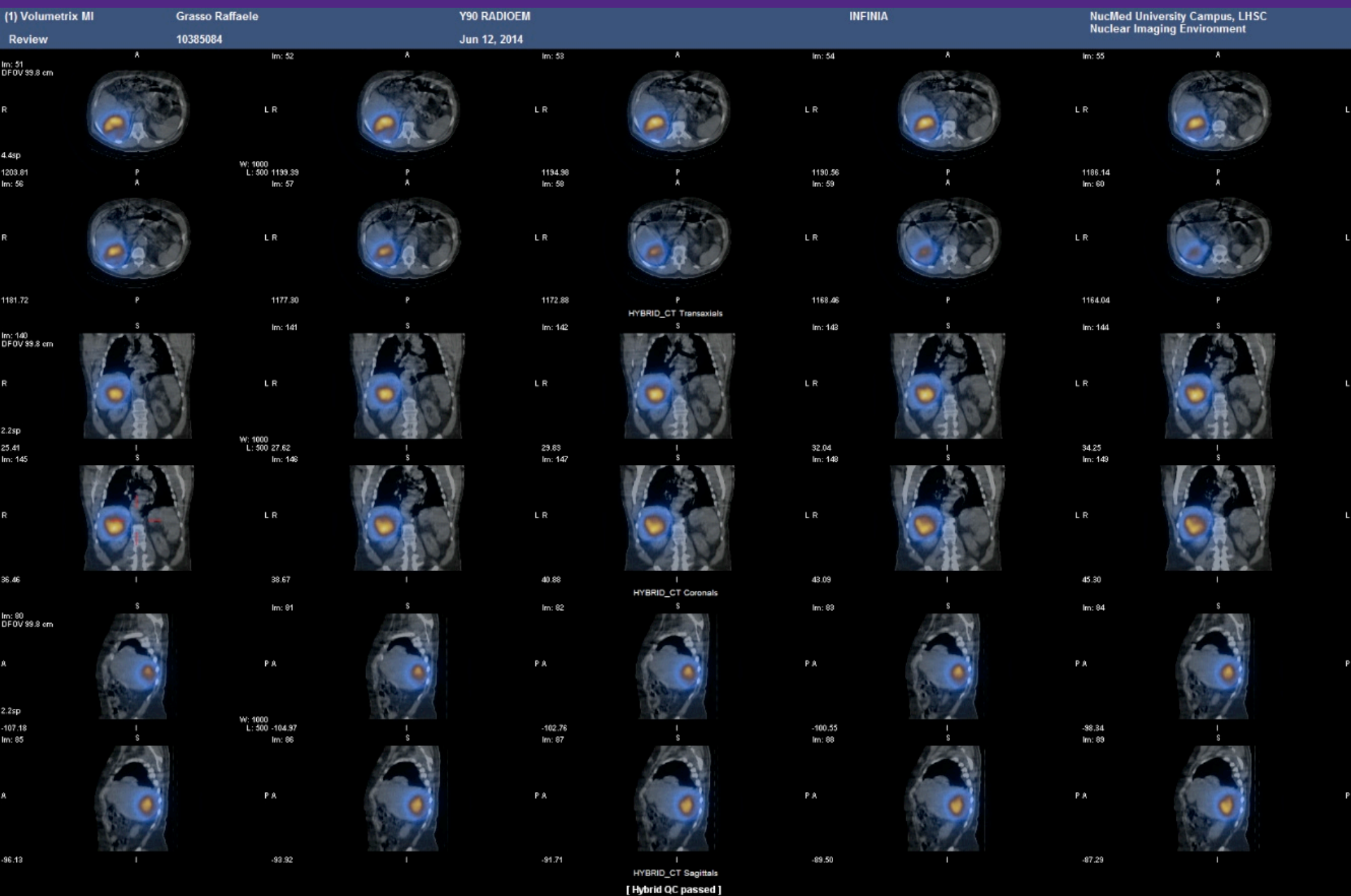
Discussed at the Neuroendocrine tumour board meeting...

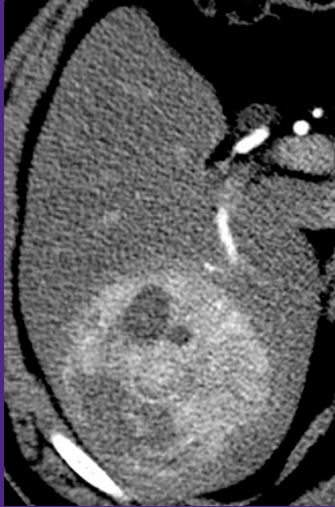
Who should we treat with transarterial therapies?

- At LHSC, we reserve transarterial therapies for patients with low or intermediate grade NET (G1 or G2) with:
 - Liver only metastases
 - Liver predominant metastases with low volume and dormant disease outside the liver
 - “functional disease” or patients with carcinoid syndrome (flushing, diarrhea)
- What are our goals of care?
 - Prolong life, prevent disease progression, improve patient symptoms (carcinoid syndrome) and valve dx

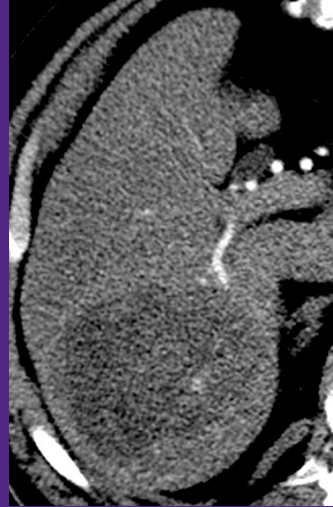








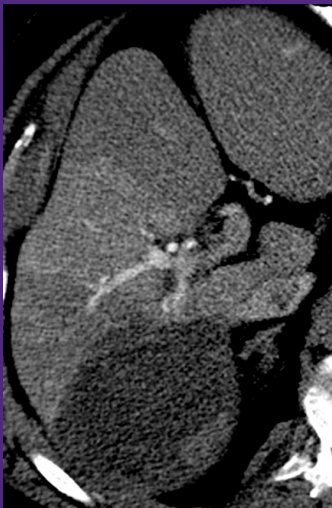
Pre-Y90



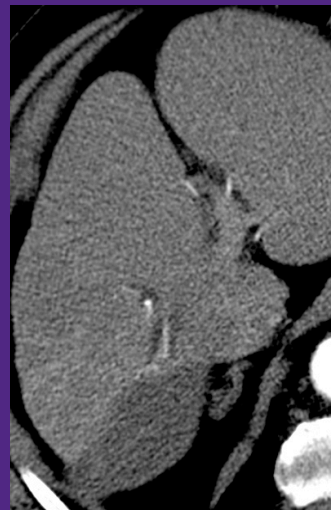
2 months



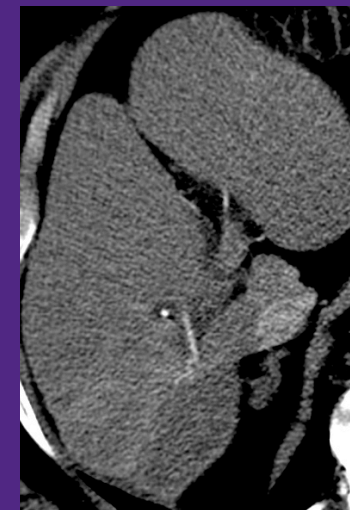
4 months



10 months



17 months



24 months

Next steps?

- Work with CCO and CNETS to advocate for provincial funding for Y90
- Advocate at the local and provincial level to health care providers to improve awareness of the disease and promote importance of multidisciplinary care and tertiary care centres with experience treating NET

Dr. Suzanne Richter

- Incredible medical oncologist and advocate for CNETS and NET patients
- She will be missed for many reasons, including her dedication, compassion and care of patients

In conclusion

- Y90 is a novel therapy liver directed therapy for metastatic NET
- Has some advantages over bland and chemoembo with the side effect profile
- Similar therapeutic efficacy to TAE and TACE
- Health Canada approved and funded in BC and Alberta in limited cases of NET
- Work needed to fund in Ontario and other provinces

Thank you for your attention and
the invitation!



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