

# SIO Case Spotlight

**Hepatopulmonary shunt reduction via bland embolization before Y-90 radioembolization of hepatic neuroendocrine tumor**

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2019



# Disclosures

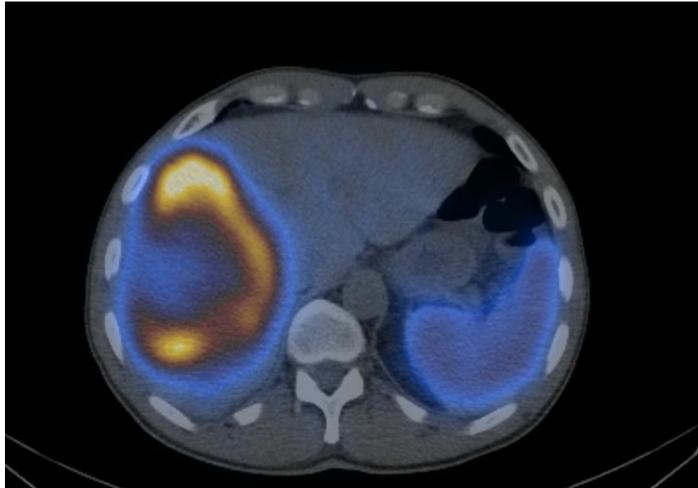
- Jacob Miller: None
- Seza Gulec: None
- Brian Baigorri: None
- Roberto Fourzali: None

# Case Summary

- 66 year old gentleman with no significant past medical or surgical history presents with nausea and vomiting. Found to have 13 cm neuroendocrine tumor of the right hepatic lobe and 2 cm tumor left hepatic lobe; primary tumor was not identified. Patient was deemed to be a candidate for radioembolization therapy by multidisciplinary tumor board. Work-up revealed a liver-to-lung shunt ratio of 12.4%.

# Imaging

- Octreotide SPECT/CT scan demonstrates increased uptake in 13-cm right hepatic neuroendocrine tumor. No extrahepatic uptake was demonstrated. 2cm left hepatic daughter tumor not shown.

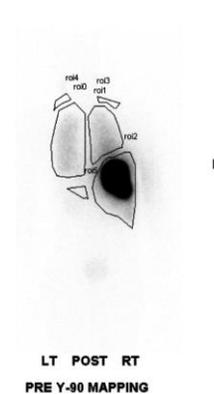
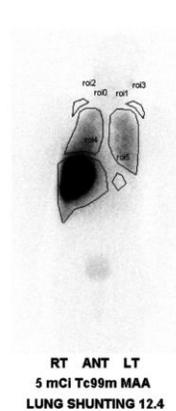


# Hepatopulmonary shunt

- Clinical challenge: Current guidelines for hepatic radioembolization recommend a lung shunt fraction (LSF)  $<20\%$  to avoid complications such as fatal radiation pneumonitis. While dose reduction is typically employed to keep expected lung dose  $<30$  Gy in cases where LSF is  $>10\%$ , dose reduction would provide suboptimal dosing and continue to allow suboptimal lung radiation exposure. Bland embolization for shunt reduction allows for optimal dosing while simultaneously minimizing or preventing pulmonary complications from harmful radiation exposure. No guidelines exist for shunt reduction techniques.

# Imaging

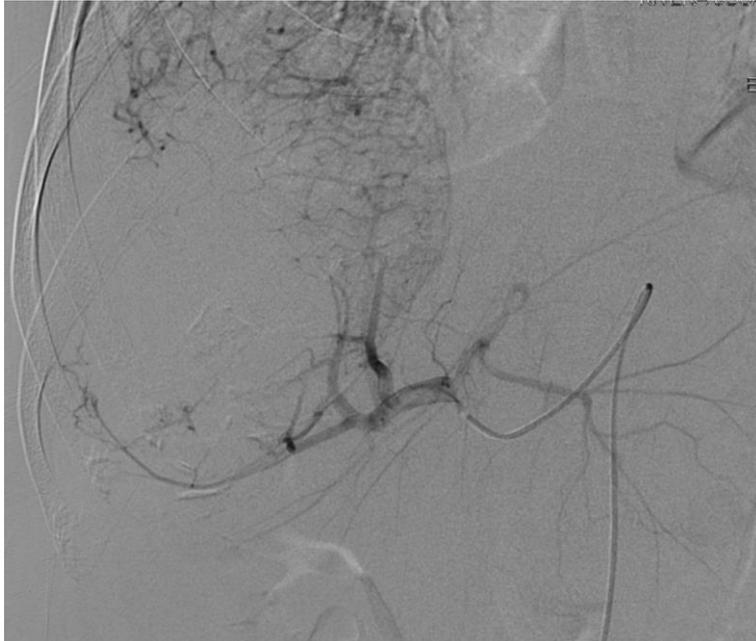
- Whole body planar Tc99m MAA scintigraphy demonstrating 12.4% LSF. SPECT images were obtained (not shown), confirming hepatic shunting.



# Bland embolization

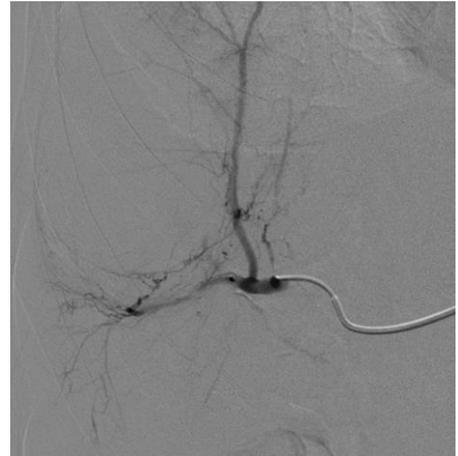
- Clinical course: The patient underwent right femoral catheterization and bland embolization of hepatic segments 5, 7, and 8 with 700-900 micron Embospheres<sup>®</sup> in sequential fashion via microcatheter until stasis was achieved. These larger diameter microspheres were chosen as they would provide the greatest chance of shunt reduction with low risk of non-target embolization. Repeat nuclear scintigraphy was performed which demonstrated a reduced LSF of 2.2%.

# Bland embolization (continued)



# Imaging

- Based on imaging, right hepatic lobe volume of 1473 mL was used to calculate the dose using the partition model. Radioembolization of the right hepatic lobe with 2 GBq Y-90 was performed without complications.



# Outcome

- The patient had no major postprocedural complications, and reported cessation of nausea and vomiting. Repeat abdominal imaging 7 weeks later demonstrated partial response (mRECIST criteria), with a decrease from 13 cm to 9 cm greatest dimension, minimal enhancement of the mass, and expected interval hypertrophy of the left hepatic lobe. Repeat CT at 6 months demonstrates no enhancement. The patient remains in excellent clinical condition.



# Discussion

- TARE is established in the treatment of metastatic CRC (2A) and an emerging treatment modality in the management of HCC and metastatic neuroendocrine disease.1,2,3
- Hepatopulmonary shunts are always evaluated before treatment, and routinely managed with dose reduction.4,5
- Various shunt reduction techniques exist including: bland embolization, pre-treatment chemoembolization, hepatic vein balloon occlusion, and variceal coil embolization.6,7,8
- No guidelines currently exist for shunt reduction techniques, which have proven to be safe and effective.
- As long as shunt reduction is confirmed same day as y90 administration, reduction and therapy can be performed same day, though it is acceptable to wait days to weeks. The available literature on this topic has same-day reduction and therapy in most “methods” sections. The emphasis is that shunt reduction confirmation with MAA mapping be performed same day as y90 therapy.

# References

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