Yttrium-90 (Y-90) Radioembolization in a Freestanding, Office-Based Lab

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Purpose

To evaluate the safety, efficiency, and efficacy of Y-90 trans-arterial radioembolization (TARE) performed in a freestanding, office-based lab (OBL) for patients with primary and metastatic liver malignancies. Although typically preformed in hospital-based settings, prior studies have demonstrated the safety and effectiveness of Y-90 in hospital-affiliated outpatient centers[1], while also establishing it's logistical and financial benefits[2]

Materials and Methods

This single-center, retrospective review analyzed 62 Y-90 TARE procedures preformed on 44 patients, 26 male and 18 female, (median age, 72.6 years) between May 2019 and May 2024 with curative and salvage intent for multiple tumor types in a freestanding, Interventional Radiology centered OBL. Data collected included patient demographics, tumor type, liver and tumor volumes, lung shunt fraction, microsphere types, dose administered, access approached, pre-treatment embolization, fluoroscopy time, procedure timing metrics, and adverse events per Society of Interventional Radiology (SIR) classification from EMR systems and patient charts. All patients underwent pretreatment imaging, volumetric analysis, and dosimetry. Procedural timing (scheduled vs. actual start, total procedural time/duration, and time to discharge) were compared with published averages for hospitals and non-freestanding OBL procedures.

References

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Variable			Value
# of Patients			44
# of TARE procedures			62
Sex, n (%)			
	Male		26 (59.1%)
	Female		18 (40.9%)
Age (y)			
	Median age at procedure		72.6
		Range	46-85
# of procedures on liver side, n (%)			
	Left lobe		23 (37.1%)
	Right lobe		39 (62.9%)
tumor type, n (%)			
	Metastatic colorectal cancer		28 (45.2%)
	Hepatocellular carcinoma		8 (12.9%)
	Metastatic nueroendocrine tumor		5 (8.1%)
	Metastatic breast cancer		6 (9.7%)
	Cholangiocarcinoma		8 (12.9%)
	Metastatic gastric carcinoma		2 (3.2%)
	metastatic esophagal cancer		2 (3.2%)
	Metastatic lacrimal cancer		1 (1.6%)
	Metastatic ocular melanoma		1 (1.6%)
metastatic cystic adeniod carcinoma of salivary gland			1 (1.6%)
Liver and tumor volumes (mL)			
	Median liver volume		1,368.0
		Range	204.0-3557.0
	Median tumor volume		94.30
		Range	5.0-1172.0
Median lung shunt (%)			4.9%
Microsphere type, n (%)			
	Resin		58 (93.5%)
	Glass		4 (6.5%)
Dose (mCi/GBq)			
	Median dose administered		25.1
		range	7.5-105.1
	Median activity		0.9
		range	0.3-3.9
arterial closure technique, n (%)			
	Mynx		36 (59%)
	Angioseal		20 (32.8%)
	radial closure device		3 (4.9%)
	manual compression		3 (4.9%)
vessel embolization, n (%)			
	# of patients embolized pre-op		19 (43.2%)
Median contrast volume			40 mL
SPECT & PET/CT, n (%)			
	SPECTs preformed following procedure		13 (21%)
	PET/CT preformed following procedure		47 (75.8%)
Symptoms, n (%)			
	Procedures with Symptoms		18 (29%)
	Median AE index		0

Figure 1.
Detailed Patient, Tumor, and Treatment Statistics collected over five years

Figure 2b.
5 bay patient pre/post-operative recovery room

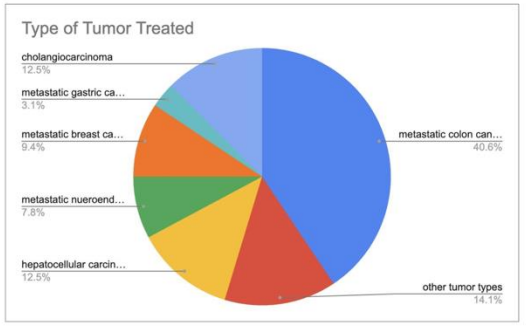

Figure 3.
Tumor treatment statistics

Figure 2a.
Siemens Artis Q Fluoroscopy suite with cone beam CT capabilities

Results

Tumor Characteristics and Procedural Metrics: Metastatic colorectal cancer was the most common tumor type (n=28, 45.2%). The median lung shunt fraction was 4.9%. Median liver and tumor volumes were 1,368 mL and 94.3 mL, respectively. Resin microspheres were used in 93.5% of cases. The median dose administered was 25.1 mCi, with a median activity of 0.93 GBq. Fluoroscopy time averaged 8.3 minutes (range, 2-48). Pre-TARE embolization was performed in 43.2% of patients, most commonly targeting the right gastric or gastroduodenal arteries. Cone-beam CT was utilized in 76% of procedures, enhancing visualization of tumor and vasculature[3]. **Procedural Timing and Outcomes:** The median delay from scheduled to actual start was 19 minutes (range, 3-41). Post-procedure, the median discharge time was 212 minutes (range, 119-441), with a median recovery time of 155 minutes (range, 35-315). Most procedures were faster than hospital averages—94% faster than hospital times and 89% than non-freestanding outpatient labs. The average actual procedure time was 63.8 minutes (range, 33-138). Excluding specialized tumor types, the average was approximately 59.9 minutes—about 43% faster than hospital times (104.4 minutes)[2] and 51% faster than non-freestanding outpatient labs (121.2 minutes)[2]. **Safety and Post-Treatment Symptoms: T**he 30-day post-TARE symptom rate was 29%, predominantly mild post-embolization syndrome (fatigue, mild abdominal pain, loss of appetite), classified as SIR index A[4].

Conclusion

Y-90 TARE can be safely and efficiently performed in a freestanding OBL, achieving significantly shorter procedure times compared to hospital and outpatient settings while maintaining similar adverse event rates. As interventional oncology expands into outpatient environments, freestanding OBLs present a scalable and effective model for Y-90 delivery.