# Initial Clinical Experience with a Novel Glass Imageable Yttrium-90 Radioembolization Microsphere for Treating Malignant Liver Tumors


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# Disclosures

**Andrew Holden, MBChB, FRANZCR:**

Medical Advisory Board Member for Medtronic, Gore, Philips, Boston Scientific

Clinical Investigator for ABK Biomedical, Bard-BD, Boston Scientific, Cagent Medical, Cook Medical, Efemoral, Endologix, Endospan, Gore Medical, Intact Vascular, Medtronic, Philips, Reflow Medical, Shockwave Medical, TriReme Medical

No other disclosures

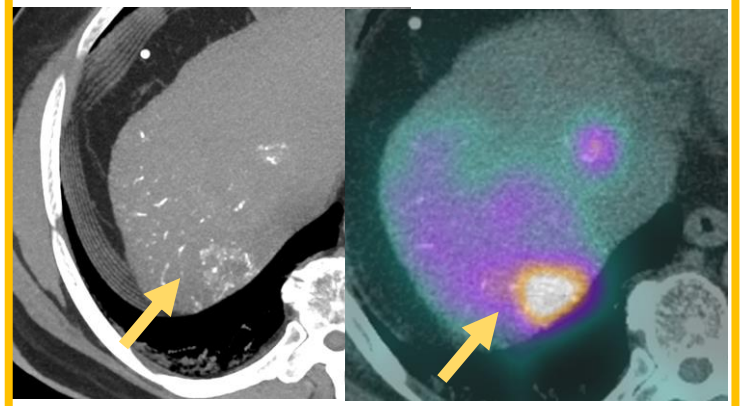
# Background – Eye90 microspheres® Similarities

| | Eye90 microspheres® | TheraSphere™ | SIR-Spheres® Y-90 Resin Microspheres |
|---|---|---|---|
| **MS size** | 20 - 30 microns | 20 – 30 microns | 32.5 microns mean |
| **Specific Activity** | up to 910MBq at time of admin | up to 2500MBq – at calibration<br>up to ~910MBq at time of admin | Up to 405MBq – at time of admin<br>(3 days pre-calib FLEXdose) |
| **MS Composition** | Glass matrix - Y90 + radiopaque elements | Glass matrix - Y90 | Resin – surface coated with Y90 |
| **Injection Control** | yes | no | yes |
| **Peri/Post Procedure CT Dosimetry** | yes | no | no |
| **Unit Dose Ordering Logistics** | Patient Personalized Unit Doses – Activity + Spheres Amount | Unit Doses of pre-determined GBq sizes | Mother dose, requires nuc med dose draw |

# Background – Eye90 microspheres®

## Imageable Y90 Microspheres

Non Con SPECT



**Multi-modality Imaging/ dosimetry**

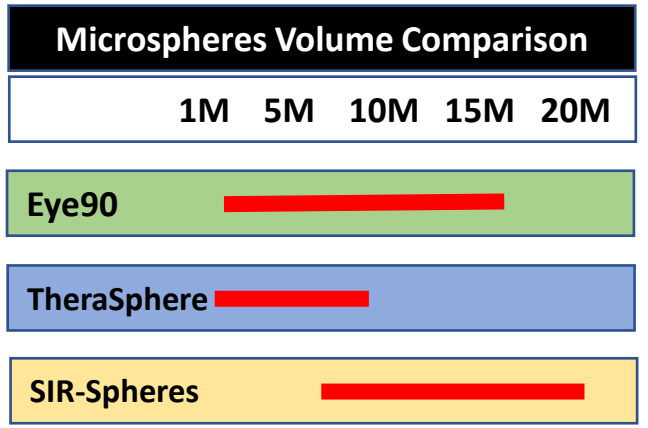
## Novel Administration Technology

Microscopy from In-vitro
Tumor Capillaries Model – NCSU

Eye90 System TheraSphere System

**Physician-controlled** injection speed,
**System-controlled MS concentration**

## Patient-Personalized Unit Dose




Physician chooses Activity Level
**AND** microspheres(MS) amount

# Purpose of Study

- To describe early human clinical experience with imageable glass Yttrium-90 (Y-90) radioembolic microspheres for malignant liver tumors (HCC & mCRC)

- 3 Month Assessment

# First-In-Human Study Overview

| Title | Investigation of safety & effectiveness of Eye90 microspheres™ in the treatment of Unresectable HCC & mCRC (NCT04926376) |
|---|---|
| Primary Investigator | Dr. Andrew Holden, MBChB, FRANZCR, EBIR<br>Auckland City Hospital, Auckland, New Zealand |
| Objectives | • Evaluate the **safety** of Eye90 treatment in patients with HCC and mCRC.<br>• Evaluate the **effectiveness** of Eye90 treatment in patients with HCC and mCRC. |
| Key Inclusion Criteria | • **At least one lesion ≥ 2 cm within the target perfused volume & no more than three lesions**<br>• **Total linear length of all lesions must be ≤ 9 cm**<br>• **Must have preservation of >700cc of normal liver parenchyma** |
| Key Safety Evaluations | • Incidence of toxicity ≥ Grade 3 by CTCAE Ver. 5.0 @ Day 90 & 180 post treatment.<br>• Incidence of Related Treatment Emergent Serious AEs (TESAEs) using CTCAE, Ver. 5.0 |
| Key Effectiveness Evaluation | • Overall Response Rate by local mRECIST via MRI of target HCC tumor(s) enhancement reduction comparing baseline to Day 180<br>• Overall Response Rate by local RECIST 1.1 via MRI of target mCRC tumor(s) size reduction comparing baseline to Day 180 |

# Dosing

- Total tumor linear length ≤ 9 cm
- >700cc non-target normal liver
- Tumor to normal ratio ≥ 3:1.
- Partition dosimetry-based treatment (MIM SurePlan Y90™)
- Post Procedure SPECT/CT
- Target Dose >205 Gy

# Methodology

- Baseline MRI, CT, liver function, performance status, FACT-Hep score
- Angiographic Mapping and 99TcMAA SPECT/CT
- Post Y-90 TOF PET/CT, SPECT CT with 4 phase Liver CT
- In-clinic follow-ups
- Labs at Days 21, 42, 90, 180, 270, and 360
- MRI follow-up at 90, 180, 270, and 360 days.

# Endpoints

## Primary safety endpoint

Incidence of toxicity ≥ Grade 3 according to Common Terminology Criteria for adverse events (CTCAE), version 5.0 at 90 and 180 days post treatment

Incidence of Related Treatment Emergent Serious Adverse Events (TESAEs) according to CTCAE, version 5.0

## Primary effectiveness endpoint

Overall Response Rate (ORR) using local mRECIST (HCC) and RECIST 1.1 (mCRC) at 180 days

## Other endpoints

mRECIST/RECIST 1.1 ORR at all timepoints

Best ORR throughout the study period

Absorbed dose quantification

FACT-Hep scores

CT radiopacity correlation/agreement with TOF PET/CT

# First-In-Human Interim Results

**6 HCC patients treated as of Dec. ’22**

- Eye90 microspheres treatment was well tolerated
- No related SAEs
- No evidence of radioembolization induced liver disease (REILD) or radiation-induced lung disease (RILI)
- No extra hepatic deposition
- Multi-modality imaging shows microsphere deposition-CT, SPECT CT, PET CT
- Radioactivity confirmed by SPECT & PET/CT
- Initial 3-month effectiveness (Complete Response) per local mRECIST observed in 5 of 6 treated subjects

ABK Biomedical inc. products are strictly investigational in nature

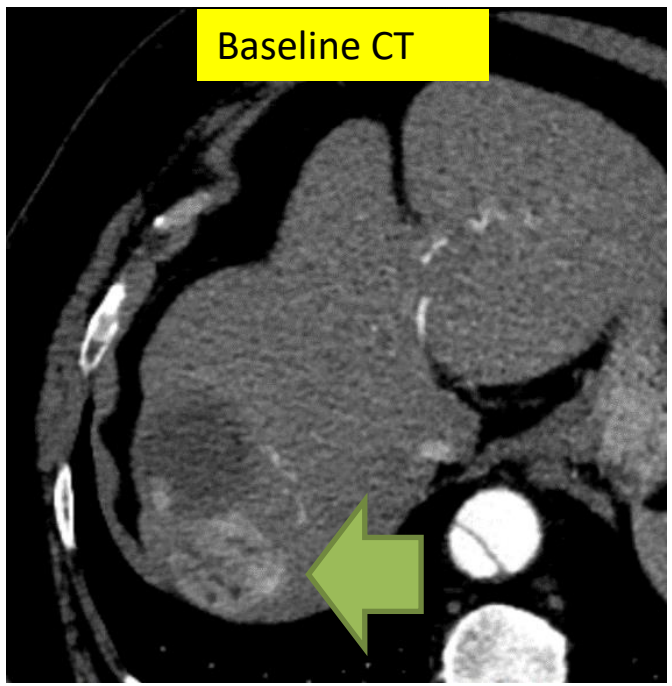
# FIH Subject Dosing & Response

Treated Tumors: 1.2 – 4.3cm  Mean absorbed dose: 73 – 998Gy

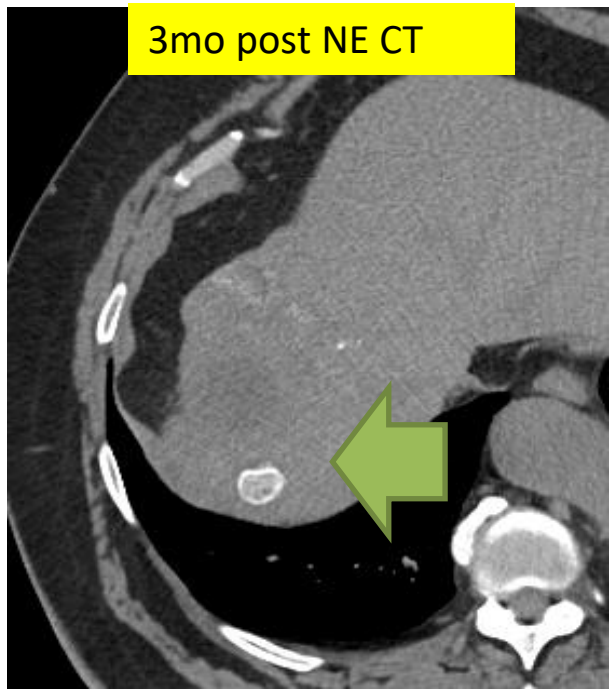
All Subjects assessed as Complete Response at 3-month post treatment follow up

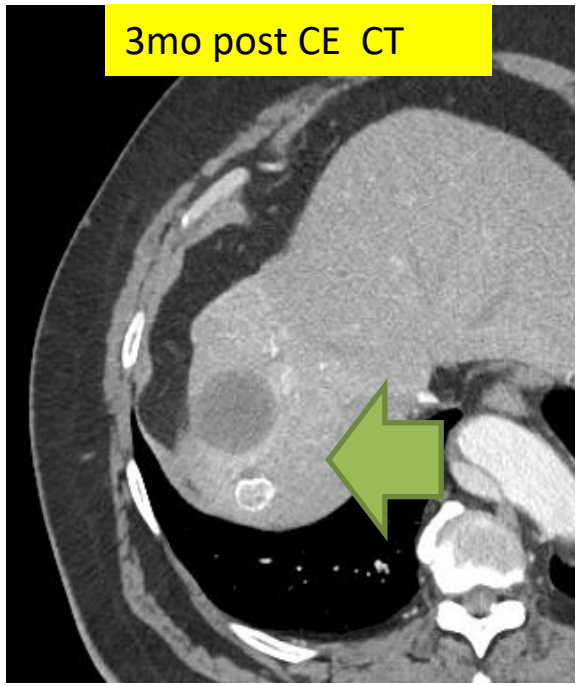
| Subject ID | Baseline / Treatment | | | |
|---|---|---|---|---|
| | Diagnosis | Lesion Size | BCLC | Post Y90 Dosimetry (SPECT) |
| 001-004 | HCC | 3.6 cm | A | N/A |
| 001-007[3] | HCC | 3.5 cm | B | 673 Gy |
| | HCC | 1.2 cm | B | 137 Gy |
| 001-005 | HCC | 4.3 cm | A | 124 Gy |
| 001-006 | HCC | 2.6 cm | A | 127 Gy |
| 001-008 | HCC | 3.0 cm | A | 217 Gy |
| 001-009 | HCC | 3.5 cm | A | 73 Gy |

# Subject ID #005: Segment 7 HCC
# Treated with 2.8 Gbq, 328 mg Unit Dose, Mean dose= 124 Gy








4.3 x 4.0 cm
LIRAD 5

2.1X 1.9 cm
Complete Response

Note: 3-month MRI Not available due to weight gain

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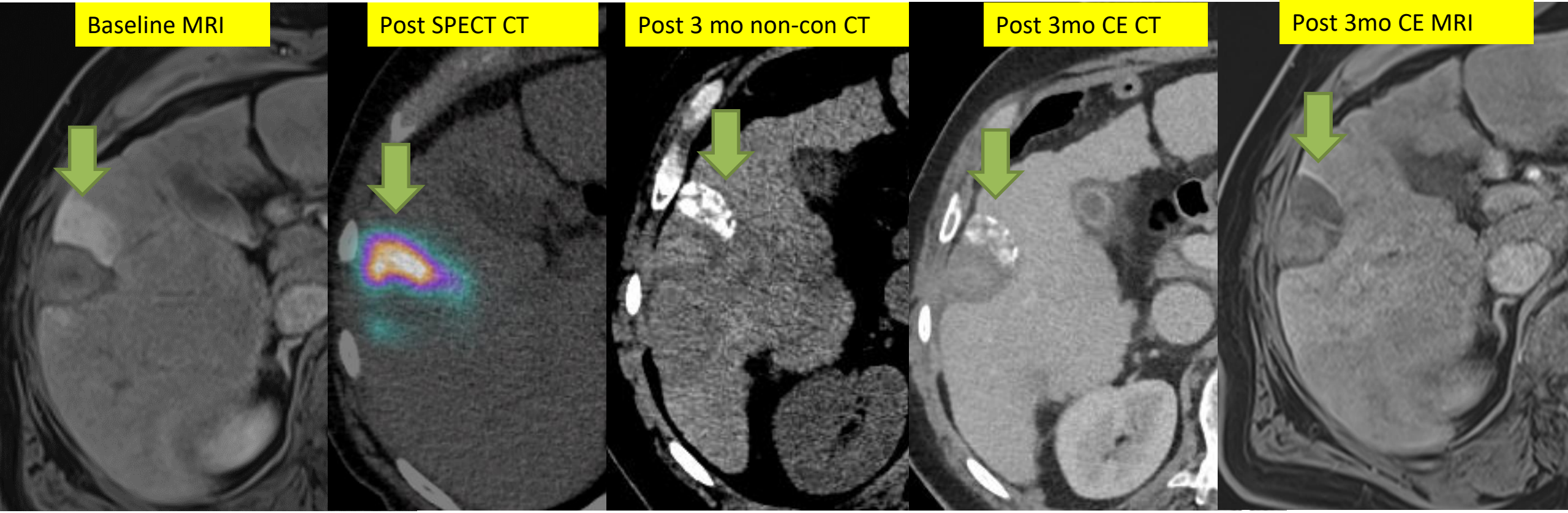
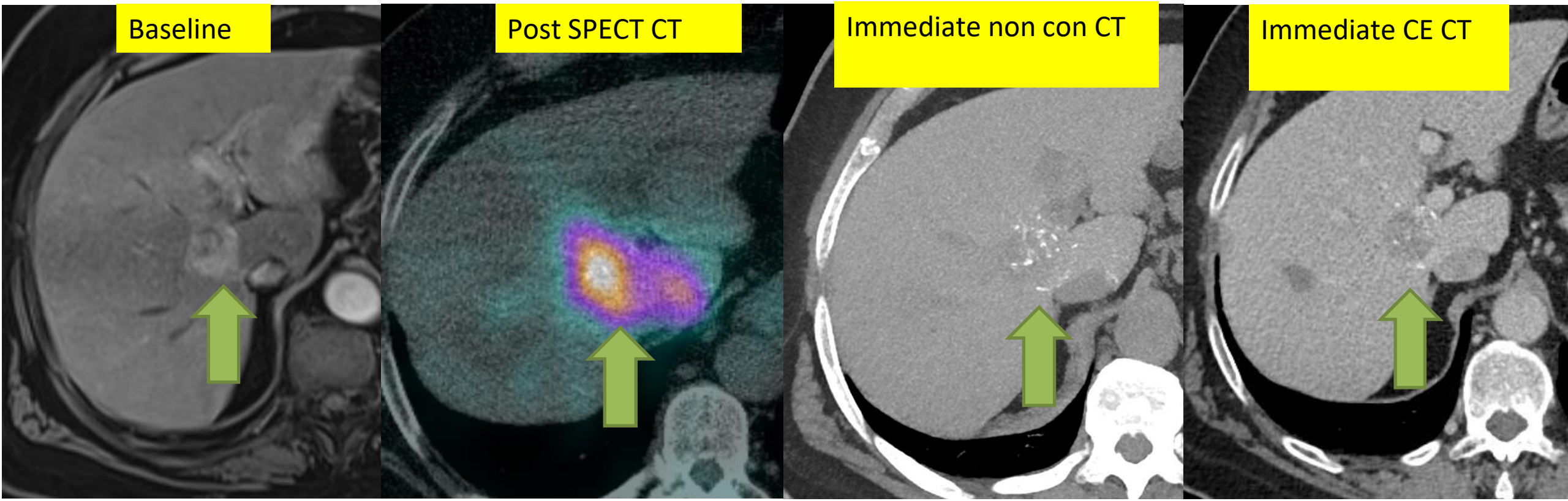
# Subject ID #007: Segment 5 HCC
# Treated with 0.8 Gbq, 110 mg Unit dose, Mean dose: 673 Gy




3.5 x 2.1 cm
LIRAD 5

1.3 x 1.5 cm
Complete Response

# Subject ID#009: Segment 5/1 HCC
# Treated with 0.5 Gbq, 100 mg Unit Dose, Mean dose=73 Gy




3.5 x 2.9 cm
LIRAD 5

TBD visit planned
Jan 2023

# Multi-Modality Dosimetry

| | Tumor 1 | Perfused Liver 1 (Gy) | Tumor 2 (Gy) | Perfused Liver 2 (Gy) |
|---|---|---|---|---|
| SPECT CT (Mean) | 673 | 251 | 151 | 101 |
| CT Based (Mean) | 731 | 174 | 136 | 150 |

# FIH Subject Dosing & Response

Treated Tumors: 1.2 – 4.3cm

Mean absorbed dose: 73 – 998Gy

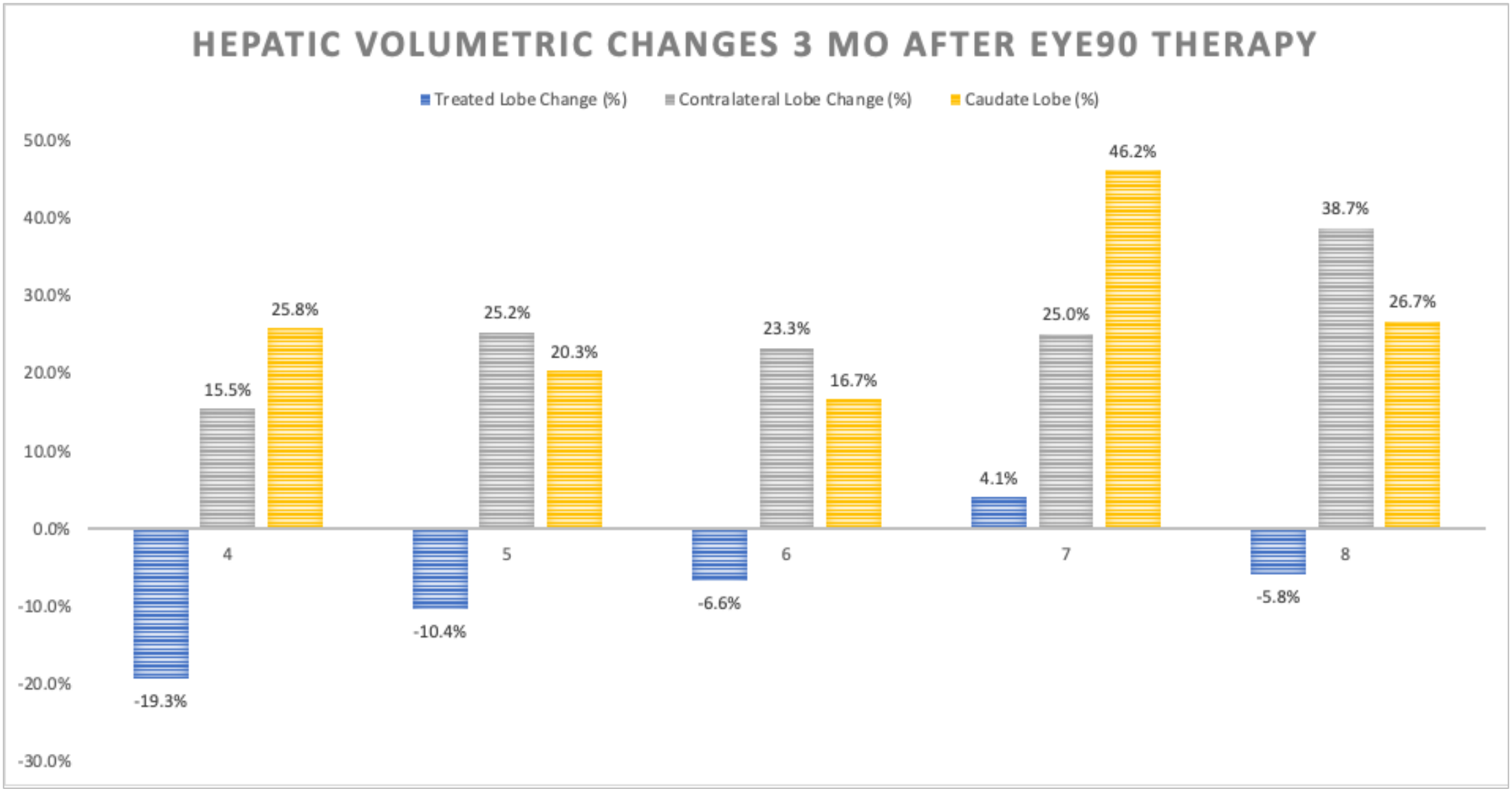
All Subjects assessed as Complete Response at 3-month post treatment follow up

| Subject ID | Baseline / Treatment | | | | Day 90 Follow up | |
|---|---|---|---|---|---|---|
| | Diagnosis | Lesion Size | BCLC | Post Y90 Dosimetry (SPECT) | Lesion Size[1] | Local mRECIST Response[2] |
| 001-004 | HCC | 3.6 cm | A | N/A | 1.4 | CR |
| 001-007[3] | HCC | 3.5 cm | B | 673 Gy | 3.1 | CR |
| | HCC | 1.2 cm | B | 137 Gy | 0.7 | CR |
| 001-005 | HCC | 4.3 cm | A | 124 Gy | 2.1 | CR |
| 001-006 | HCC | 2.6 cm | A | 127 Gy | 1.2 | CR |
| 001-008 | HCC | 3.0 cm | A | 217 Gy | 1.0 | CR |
| 001-009 | HCC | 3.1 cm | A | 73 Gy | 3.5 | SD |

[1] Non-enhancing lesion measurement [2] Local mRECIST response abbreviations: CR = Complete response; PR = Partial response

[3] Subject 001-007 had two target lesions and two different unit doses administered

# HEPATIC VOLUMETRIC CHANGES 3 MO AFTER EYE90 THERAPY



# Clinical – NZ FIH Update

**6 HCC patients treated** (Dec. ’22)

**Interim Data Conclusions**

- **Primary Endpoints Met**
  - Eye90 microspheres treatment was well tolerated
  - No related SAEs have been reported
  - No reports of REILD or RILI
  - **5/6 Patients-CR, 1 patient pending**
- **Secondary Endpoints**
  - Multi-modality imaging of Y90 MS is feasible: PET, SPECT/CT and Conventional CT
  - Multi-modality dosimetry of Y90 MS is feasible: PET, SPECT/CT and Conventional CT
- **Bonus Endpoints**
  - Growth of non treated contralateral liver segments noted- Pending Final Analysis
  - Potential Imaging Biomarker → Targeting and Tracking

Route 90

**Radioembolization Oncology Trial Utilizing Transarterial Eye90 (ROUTE 90) for the Treatment of Hepatocellular Cellular Carcinoma (HCC)**

# Upcoming Trial

# Contact Information

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