QuiremScout® Microspheres

QuiremSpheres® Microspheres

Q-Suite™ Software

THE HOLMIUM PLATFORM

Three integrated products
DELIVERING INDIVIDUALIZED SIRT
at its full potential

from ACCESS to CLOSURE
INTERVENTIONAL ONCOLOGY

TERUMO INTERVENTIONAL SYSTEMS

IS9969B09200MVI

THE HOLMIUM PLATFORM

The Holmium Platform delivers a first in SIRT; a comprehensive end-to-end platform for treating unresectable liver tumours.

The Holmium Platform consists of three integrated products that allow you to select patients with confidence, deliver treatment with precision and plan and verify with accuracy.

The Holmium Platform:

Delivering Individualized Treatment to the Right Patient

QuiremScout® Microspheres

CONFIDENCE
in patient selection

QuiremSpheres® Microspheres

PRECISION
in delivering SIRT as planned

Q-Suite™ Software

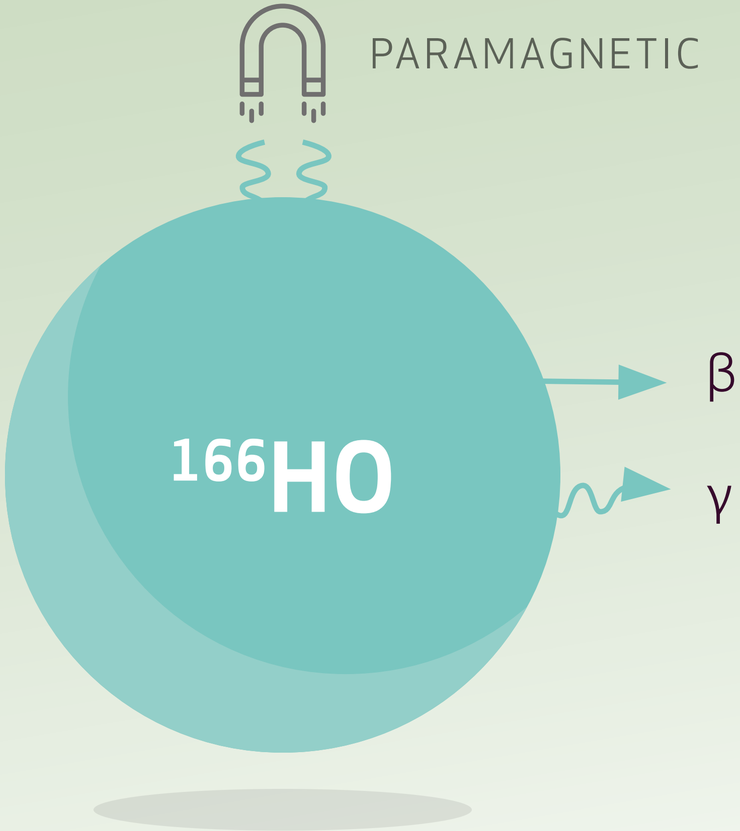
ACCURACY
in treatment planning and verification

IM0026GB6968SI

TERUMO INTERVENTIONAL SYSTEMS

INNOVATION WITH HOLMIUM

QuiremSpheres® and QuiremScout® consist of Holmium-166 microspheres that offer unique imaging capabilities



Holmium is highly paramagnetic and can be visualized with high-resolution using MRI

Holmium-166 decays under emission of beta radiation and a primary gamma photon (81 keV)

IMW0268GB6965I

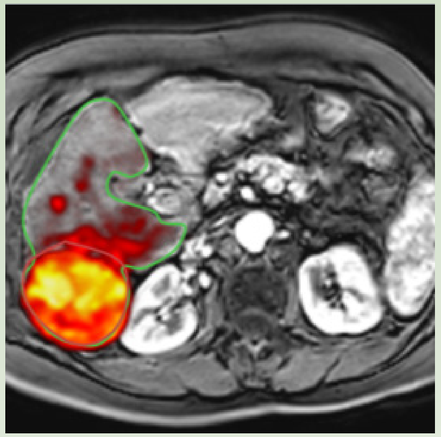
TERUMO INTERVENTIONAL SYSTEMS

INNOVATION WITH HOLMIUM

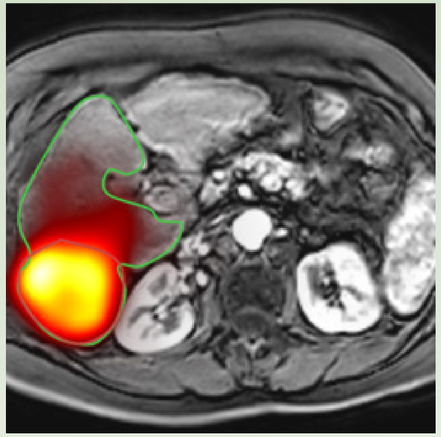
Holmium-166 microspheres allow for post-treatment visualization and quantification using MRI and SPECT, for further analysis in Q-Suite™

> QuiremSpheres® gives us the confidence we need to start individualizing treatments
>
> *Prof. Dr. Ralf-Thorsten Hoffmann*
> *Head of Interventional Radiology, University Hospital Dresden*

MRI-based dose reconstruction



SPECT-based dose reconstruction



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TERUMO INTERVENTIONAL SYSTEMS

SIRT WITH THE HOLMIUM PLATFORM

QuiremScout® Microspheres

STEP 1
Patient Selection

Q-Suite™ Software

STEP 2
Treatment Planning

QuiremSpheres® Microspheres

STEP 3
Treatment Delivery

Q-Suite™ Software

STEP 4
Dose Verification

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TERUMO INTERVENTIONAL SYSTEMS

SELECT THE RIGHT PATIENTS, WITH CONFIDENCE

QuiremScout®: the first SIRT work-up product that uses the same technology as the therapeutic microspheres, to optimize patient selection and advance treatment planning

QuiremScout® contains the same microspheres as QuiremSpheres®[1]

	^{99m}Tc-MAA	QuiremScout® ^{166}Ho	QuiremSpheres® ^{166}Ho
Particle morphology			
Material	MAA	PLLA	PLLA
Particle size (µm)	1–150	25–35	25–35
Number of particles (million)	0.2–1.2	3	15 - 30

QuiremScout® has been shown to be safe in a study of 82 patients[2,3]

1. QuiremScout® 166Ho-Scout – Instruction for use. Available at: https://www.quirem.com/ifu/
2. Braat et al. Eur Radiol 2018;28:920–28
3. Prince et al. J Nucl Med 2015;56:817–23

TERUMO INTERVENTIONAL SYSTEMS

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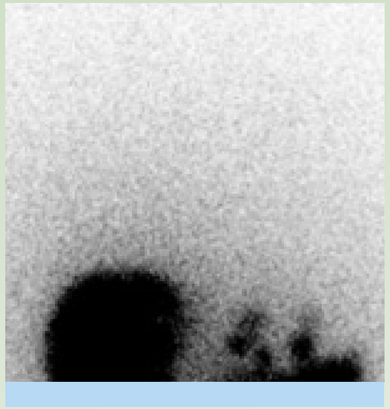
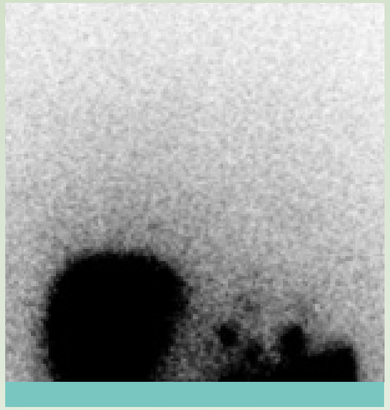
SELECT THE RIGHT PATIENTS, WITH CONFIDENCE

QuiremScout®: has been shown to be a better predictor for lung shunt and intrahepatic distribution than ^{99m}Tc-MAA[4,5]

Predicted lung dose
30 Gy based on ^{99m}Tc-MAA



Predicted lung dose
0.02 Gy based on QuiremScout®



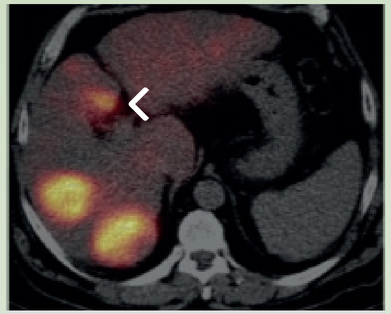
Lung dose
0.01 Gy after QuiremSpheres®

4. Elschot et al. Eur J Nucl Med Mol Imaging 2014;41:1965–75
5. Dassen et al. Presented at CIRSE 2018. Abstract available at: https://library.cirse.org/cirse2018/crs/the-predictive-value-of-the-intrahepatic-distribution-of-99mtc-macroaggregated-albumin-and-holmium-166-scout-dose-prior-to-holmium-166-radioembolization
6. Grosche-Schlee et al. QuiremScout® case study. Available at: https://www.terumo-europe.com/en-emea/clinical-program/Clinical%20Data/E_Clinical_Case_Studies_QuiremScout_LR.PDF#search=SIRT%20case%20study
7. Smits et al. Eur J Nucl Med Mol Imaging 2020;47:798–806
8. Chiesa and Maccauro. Eur J Nucl Med Mol Imaging 2020;47:744–47

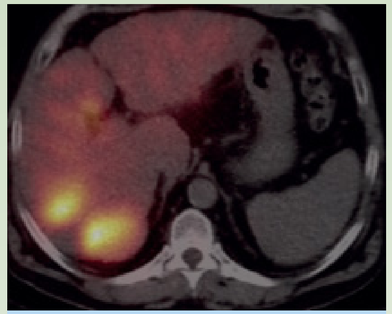
SELECT THE RIGHT PATIENTS, WITH CONFIDENCE

QuiremScout® has been shown to be more accurate at treatment planning than ^{99m}Tc-MAA, ensuring the right patients are identified for SIRT[6-8]

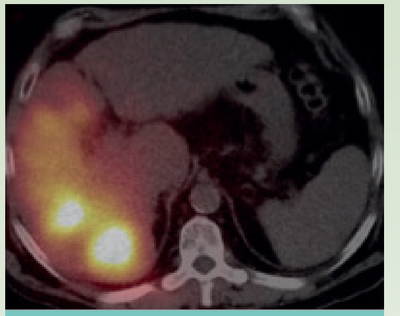
Case example



Extrahepatic accumulation of ^{99m}Tc-MAA in gall bladder
= **Physician decision that SIRT was not possible**



No accumulation in gall bladder or elsewhere outside the liver with QuiremScout®
= **Decision to proceed with SIRT was made due to little/no gallbladder uptake with QuiremScout®**



The post-treatment distribution of **QuiremSpheres®** was almost identical to the distribution of QuiremScout®

4. Elschot et al. Eur J Nucl Med Mol Imaging 2014;41:1965–75
5. Dassen et al. Presented at CIRSE 2018. Abstract available at: https://library.cirse.org/cirse2018/crs/the-predictive-value-of-the-intrahepatic-distribution-of-99mtc-macroaggregated-albumin-and-holmium-166-scout-dose-prior-to-holmium-166-radioembolization
6. Grosche-Schlee et al. QuiremScout® case study. Available at: https://www.terumo-europe.com/en-emea/clinical-program/Clinical%20Data/E_Clinical_Case_Studies_QuiremScout_LR.PDF#search=SIRT%20case%20study
7. Smits et al. Eur J Nucl Med Mol Imaging 2020;47:798–806
8. Chiesa and Maccauro. Eur J Nucl Med Mol Imaging 2020;47:744–47

CASE STUDY[9]

"[This patient], originally deemed to be a non-surgical candidate, underwent a curative resection after radioembolization with QuiremSpheres®"

Dr. Irene Bargellini, Head of Radiology, Cuneo Hospital

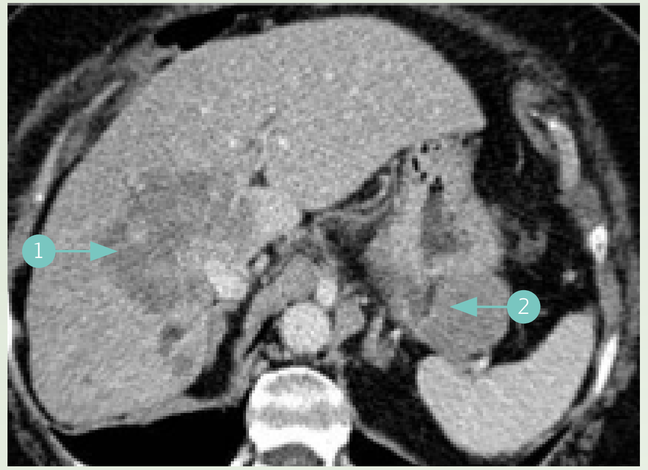
March–July 2018

Female, 69 years old
Hx: obesity, arterial hypertension

Hospitalized for trauma:
Mild increases of GGT and AST

Undergoes CT examination

CT findings:



73 mm

July 2018

December 2018

February 2019

March 2019

1 **Biopsy:** iCC

2 **Resection:** GIST

Treatment decision for iCC: work up for SIRT

9. Bargellini I et al. Presented at ECIO 2019. Available at: https://library.cirse.org/ecio2019/events/2019-04-09-13-00-terumo-sirt-is-back-welcome-to-quiremscout

TERUMO INTERVENTIONAL SYSTEMS

IMW0028GB6981

CASE STUDY[9]

"[This patient], originally deemed to be a non-surgical candidate, underwent a curative resection after radioembolization with QuiremSpheres®"

Dr. Irene Bargellini, Head of Radiology, Cuneo Hospital

March–July 2018

July 2018

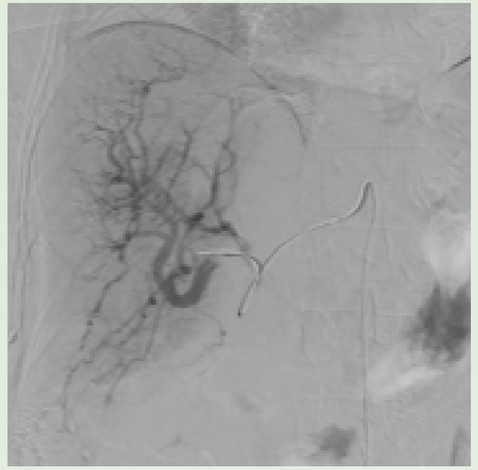
December 2018

February 2019

March 2019

Work-up for SIRT, using ^{99m}Tc-MAA

Ineligible for SIRT because of gallbladder uptake



Treatment decision for iCC: systemic therapy

9. Bargellini I et al. Presented at ECIO 2019. Available at: https://library.cirse.org/ecio2019/events/2019-04-09-13-00-terumo-sirt-is-back-welcome-to-quiremscout

TERUMO INTERVENTIONAL SYSTEMS

IS69GB0820MM

CASE STUDY[9]

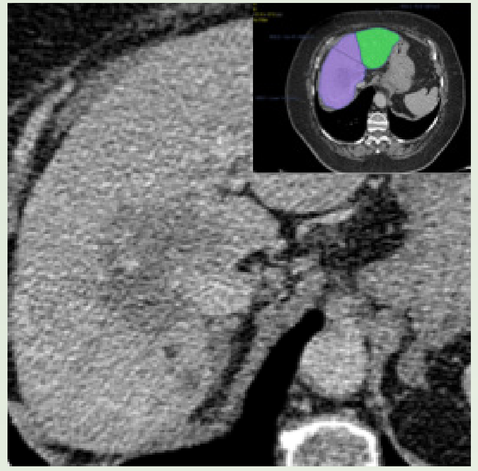
"[This patient], originally deemed to be a non-surgical candidate, underwent a curative resection after radioembolization with QuiremSpheres®"

Dr. Irene Bargellini, Head of Radiology, Cuneo Hospital

March–July 2018 | July 2018 | **December 2018** | February 2019 | March 2019

6 months' follow up

Total LV: 1475 cc
FLR (S2–S3): 587 cc (39%)



60 mm

Resection ruled out because:

Obesity and presence of steatosis
Chemotherapy for 6 months
Elevated bilirubin and GGT
Proximity of lesion to IVC

Resection ruled out

Treatment decision, QuiremScout® workup

9. Bargellini I et al. Presented at ECIO 2019. Available at: https://library.cirse.org/ecio2019/events/2019-04-09-13-00-terumo-sirt-is-back-welcome-to-quiremscout

IM0028GB69691

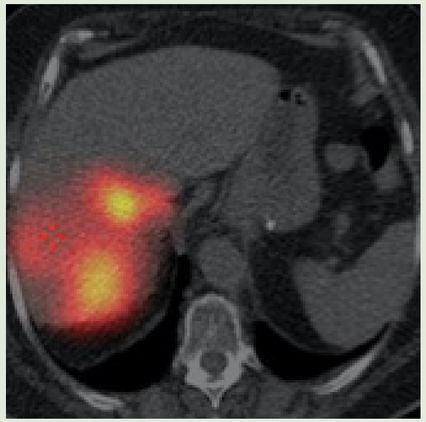
CASE STUDY[9]

"[This patient], originally deemed to be a non-surgical candidate, underwent a curative resection after radioembolization with QuiremSpheres®"

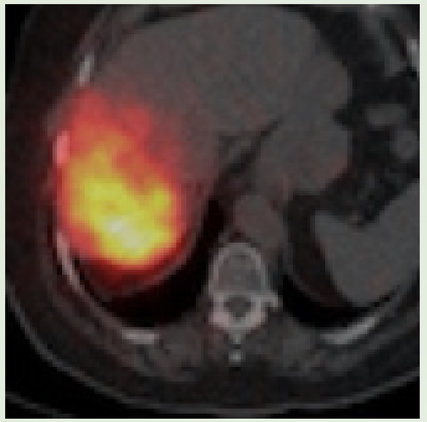
Dr. Irene Bargellini, Head of Radiology, Cuneo Hospital

March–July 2018 · July 2018 · December 2018 · **February 2019** · March 2019

Work-up for SIRT, comparing ^{99m}Tc-MAA with QuiremScout®

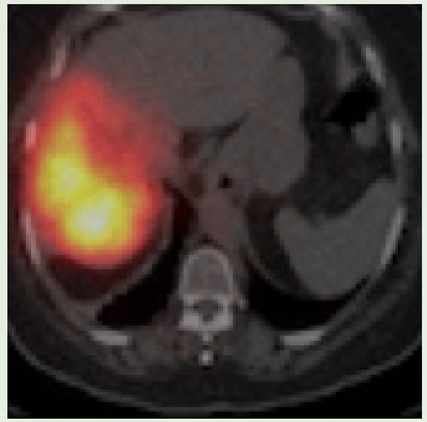


^{99m}Tc-MAA SPECT/CT



QuiremScout® SPECT/CT

Followed by SIRT with QuiremSpheres®



QuiremSpheres® SPECT/CT after SIRT

9. Bargellini I et al. Presented at ECIO 2019. Available at: https://library.cirse.org/ecio2019/events/2019-04-09-13-00-terumo-sirt-is-back-welcome-to-quiremscout

IS6998GB20200MVI

TERUMO INTERVENTIONAL SYSTEMS

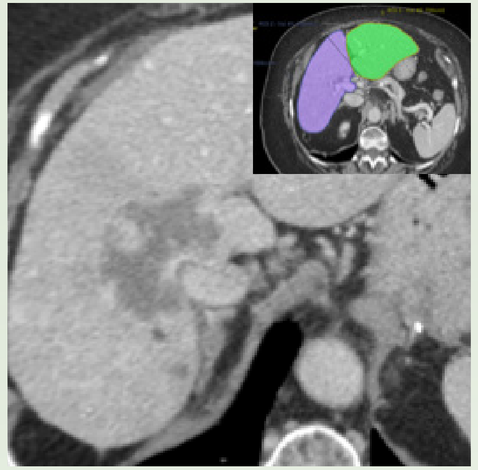
CASE STUDY[9]

"[This patient], originally deemed to be a non-surgical candidate, underwent a curative resection after radioembolization with QuiremSpheres®"

Dr. Irene Bargellini, Head of Radiology, Cuneo Hospital

March–July 2018 — July 2018 — December 2018 — February 2019 — **March 2019** — Liver Resection

45 days' follow up after QuiremSpheres® SIRT



55 mm

Total LV: 1556 cc

FLR (S2–S3): 700 cc (45%)

FLR (S2–S3–part of S4): 780 cc (50%)

Treatment decision for iCC: Resection

9. Bargellini I et al. Presented at ECIO 2019. Available at: https://library.cirse.org/ecio2019/events/2019-04-09-13-00-terumo-sirt-is-back-welcome-to-quiremscout

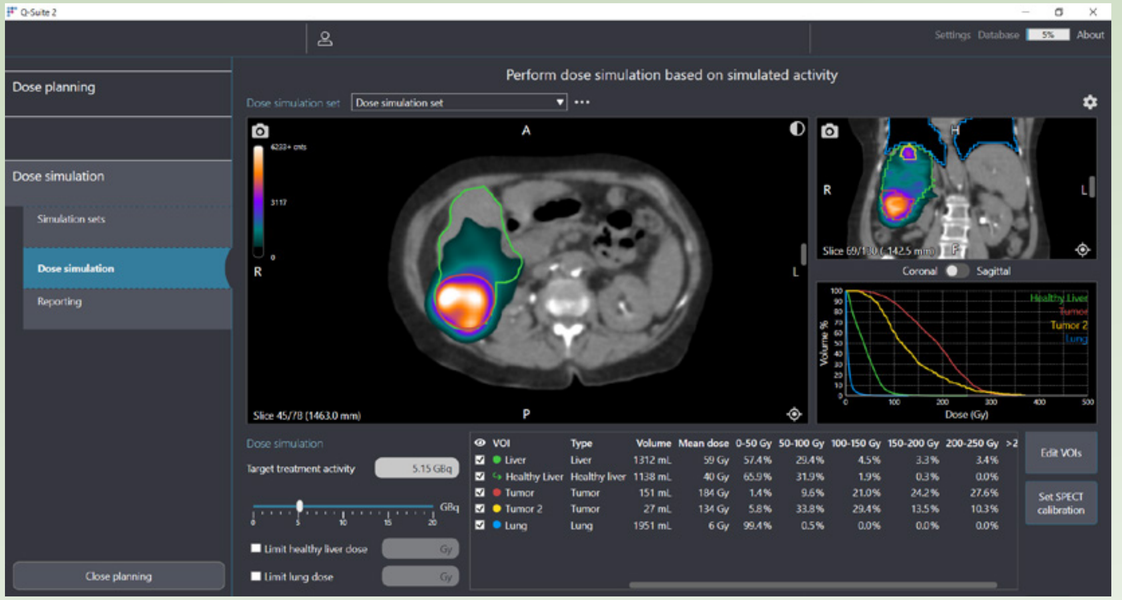
PLAN WITH ACCURACY

Q-Suite™:
Dedicated Holmium-166 software for individualized treatment planning

Treatment Activity Planning as recommended in QuiremSpheres® instructions for use

Lung Dose Prediction based on SPECT after QuiremScout® and/or Tc-^{99m}MAA

Pre-Treatment Dose Simulation – Multi-compartment treatment planning based on QuiremScout® and/or Tc-^{99m}MAA



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DELIVER SIRT, AS PLANNED

QuiremSpheres®: The only therapeutic SIRT microsphere that is used as part of a fully integrated platform, to improve patient outcomes and advance the future of SIRT

The short half life of Holmium-166 in QuiremSpheres® ensures delivery of a high dose rate (90% of radiotherapy dose delivered within 4 days)

Clinical evidence demonstrates that QuiremSpheres® are efficacious[10], well tolerated[11], and safe[10,12] for the treatment of unresectable liver cancer

> With QuiremSpheres® we see the majority of our patients responding much quicker than what we are used to seeing with Yttrium-90 ®
>
> *Dr. Irene Bargellini, Head of Radiology, Cuneo Hospital*

10. Prince et al. J Nucl Med 2018;59:582-88
11. van Roekel et al. Clin Exp Metastasis 2020;37:95-105
12. Smits et al. Lancet Oncol 2012;13:1025-34

IS6698GB0820MVI

DELIVER SIRT, AS PLANNED

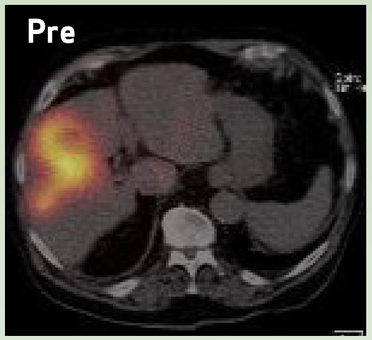
Clinical case examples:

1. 84-year-old HCC patient

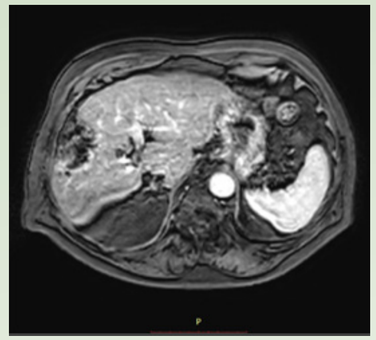
Baseline Scan

Large HCC tumours in segments IV, V, VI and VIII; plus two satellite lesions in segment VIII

QuiremScout® and treatment dose Distribution Based on SPECT/CT



Follow-Up Scan



At 9 months

Complete response (including satellite lesions)

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DELIVER SIRT, AS PLANNED

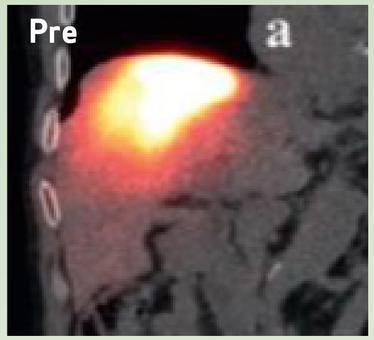
Clinical case examples:

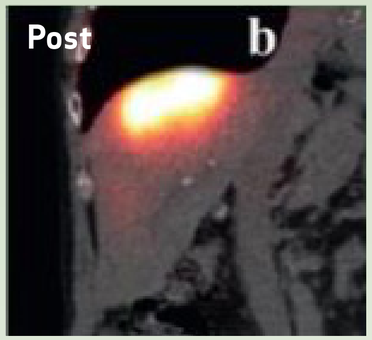
2. 80-year-old mCRC patient

Baseline Scan

4 cm lesion traversing segments VII and VIII of the liver

QuiremScout® and treatment dose Distribution Based on SPECT/CT





Follow-Up Scan

At 3 months

Complete response with sparing of the surrounding liver parenchyma

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DOSE VERIFICATION

Q-Suite™:
accurate post-treatment dosimetry to verify the radiation dose delivered

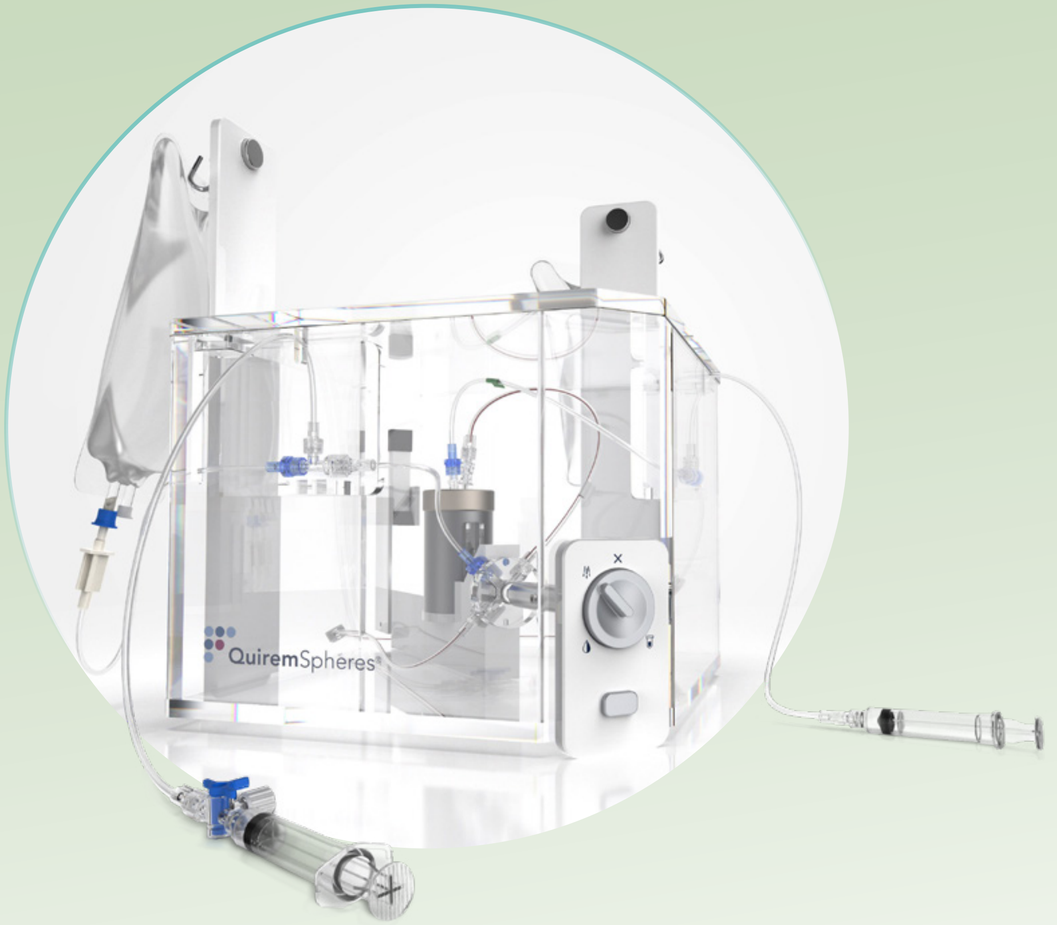
Dose Reconstruction based on quantitative Holmium-166 MRI or SPECT

Evaluation of Dose absorbed in tumour and in healthy liver tissue

DELIVER WITH EASE

QuiremSpheres® and **QuiremScout®** are administered using the same intuitive and efficient administration system

The system is easy to learn – it has been developed in collaboration with leading SIRT physicians and incorporates features that you may already be familiar with if you have performed SIRT.



UNPARALLELED SUPPORT

Full service set-up and support is provided, making it easy to start using The Holmium Platform in your centre

- **A comprehensive and tailored training program will be provided.**
- **Full assistance to set up imaging systems for Holmium-166**
- **Local QuiremSpecialist to support your daily clinical practice**

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TERUMO INTERVENTIONAL SYSTEMS

ADDITIONAL TECHNICAL INFORMATION

Technical comparison of Holmium-166 and Yttrium-90

> We do not know which is 'the best particle' for radioembolization, but for sure we now know which is the best one nowadays for individual treatment planning [Holmium-166]
>
> *Chiesa C and Maccauro M. 2020 EJNMMI*

Isotope	**Holmium-166 (QuiremSpheres® and QuiremScout®)**	**Yttrium-90**	
Beta radiation (MeV)	1.77 (48.7%) 1.85 (50.0%)	2.28	
Gamma radiation (keV)	81 (6.7%)	-	
Half life (h)	26.8	64.1	
Material	PLLA	Resin (r)	Glass (g)
Diameter (µm)	25-35	r: 20-60	g: 15-30
Density (g/cm3)	1.4	r: 1.6	g: 3.3

TERUMO INTERVENTIONAL SYSTEMS

QuiremScout® Microspheres

QuiremSpheres® Microspheres

Q-Suite™ Software

AST, aspartate aminotransferase
FLR:, uture liver remnant
GGT, gamma-glutamyl transferase
GIST, gastrointestinal stromal tumour
iCC, intrahepatic cholangiocarcinoma
IVC, inferior vena cava
LV, liver volume

TERUMO INTERVENTIONAL SYSTEMS

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