Clinical study demonstrates a higher rate of complete tumor response when using embolization with Liver ASSIST*

Meet the experts

Professor François Cornelis, MD, Ph.D., FCIRSE is Head of the Interventional Oncology Department at Tenon Hospital, Sorbonne University, Paris, France. He specializes in Interventional Oncology, in particular liver cancer, and performs all types of image guided, simple and complex, endovascular and percutaneous procedures.

Located in Paris, France, Tenon Hospital is an academic medical center that integrates clinical and hospital care with research and education. The Interventional Oncology department of Pr. François Cornelis is part of a large oncology pole and has 600 hospital beds, 13 operating rooms and 2 Interventional suites. This Interventional Oncology department treats 2000 new patients per year and performs 500 image guided endovascular & 200 percutaneous ablation procedures per year.

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Prof. Cornelis, you are the first author of a study called "Hepatic arterial embolization using CBCT with tumor feeding vessel detection software: Impact on hepatocellular carcinoma response," published in Cardiovascular and Interventional Radiology in July 2017.[3] The article concludes: "HCC embolized with Liver ASSIST may result in improved local tumor response without increasing the dose exposure."

What is the impact of the study in the interventional oncology community?

Prof. Cornelis: "I think Liver ASSIST users have already anticipated these results; we only proved what they expected. When using Liver ASSIST, I have two objectives. One is obviously to achieve accurate and precise treatment, the second is to standardize practice across patients and operators and thus reduce outcomes variability.
Even if this latter was not the primary goal of our study, the results are pointing in this direction."

Is this study the first of its kind? Or have other studies been published with other tumor-feeding vessel detection software?

Prof. Cornelis: "To my knowledge this was the first published study focusing on tumor response, comparing the results with and without the software."

Why is it important to get complete tumor response?

Prof. Cornelis: "Complete tumor response is correlated with survival. It has also been shown that a partial treat-ment can trigger disease progression by selecting clonal cell profiles that will be more aggressive in the future. But what is clear, and it has been demonstrated in our study, is that Cone Beam CT associated with Liver ASSIST is correlated to more complete tumor response rates."

Is the 68% complete tumor response rate that has been demonstrated, compared to 36% with DSA alone, something truly meaningful?

Prof. Cornelis: "Almost 70% is clearly a very good number. We are talking about 70% in a population that is considered for palliative treatment only. This is a population which generally does not reach 70% success. With radiofrequency treatment in the liver and metastases, we typically reach between 50% and 60% success, which can be considered as high[1]. In our study we exceed this level. Of course, follow-up duration may be challenged, but in this population, a 20 months follow-up is already quite significant, especially knowing this success rate was already reached after 3 to 4 months follow-up."

If complete tumor response is correlated to survival, can we consider it is predictive of the potential evolution the overall disease?

Prof. Cornelis: "Yes, because the tumor is simply no longer there. One of many implications is that patients with better complete response rate will return less often for additional treatments.
The risk of complications associated with each intervention is therefore reduced for these patients."

Your article concludes that a higher complete response rate was observed for HAE using Liver ASSIST guidance versus 2D imaging alone. How would you explain such a result?

Prof. Cornelis: "Of course, experts often feel they do not need such tools to reach optimal treatment, but I consider we should have outcome predictors and reproducibility across patients and operators. In this study, the software enabled optimal treatments whatever the operators' experience was.
Moreover, Liver ASSIST is user friendly and its use can become systematic to limit variability.
After training, the workflow can even be completely driven by a technician to support the operator whom is busy in the procedure room."

So, you're saying that Liver ASSIST ultimately brings expertise at low cost?

Prof. Cornelis: "Yes, that's exactly it. Even the expert will benefit from Liver ASSIST. It can be compared to an airplane on-board computer which does all the work during take-off and landing. This dimension of simulation and assistance is actually what we ultimately need.
We have reached such a level of technicality in our minimally invasive procedures, that we need these tools.
I can remember a case where although the information provided by Liver ASSIST was available the operator decided not to take it into account, to discover at the end a residual feeder had been missed, while Liver ASSIST had found it."

Based on these results, would you recommend using Liver ASSIST more often?

Prof. Cornelis: "Systematically. All the time."

Would you say Liver ASSIST allows you to be more selective and allow patients to better tolerate the intervention?

Prof. Cornelis: "Yes. Selectivity is associated with less

ischemia, systemic toxicity, pain and discomfort following the procedure. In the same time, selectivity allows for higher tumoral toxicity and local result."

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>
> *Pr. François Cornelis*

In conclusion, what would you say about the Cone beam CT /Liver ASSIST association?

Prof. Cornelis: "Getting more complete response in the most tolerable way possible for the patient will help us feel more confident to proceed with a new session. We have patients who refuse to have a new chemoembolization due to post-treatment discomfort without assurance of efficacy. If a first treatment goes really well, a patient might become more receptive to repeated treatments, and can benefit from what becomes chronic care.
Big tumors are often detected late, when the patients are weaker, in a more complex clinical state. In such cases, why not considering the combination of chemoembolization followed by ablative treatments that are more curative indications?
One recent paper[2] showed that the best results are obtained when chemoembolization and ablation are combined, rather than chemoembolization alone.
I believe this combination will soon become the standard of care. That reinforces my proposal to perform a Cone Beam CT, then proceed with a chemoembolization with Liver ASSIST, and finally use the fusion tools for an ablation with ultrasound and INTERACT Active Tracker.***""

*Liver ASSIST is a comprehensive solution dedicated to the liver to prepare, plan and to facilitate guidance of endovascular procedures. It optimizes procedure selection & preparation thanks to automatic liver anatomy segmentation & evaluation (Hepatic VCAR) and provides a high sensitivity in detecting arteries leading to the vicinity of hypervascular lesions in the liver (FlightPlan for Liver). Liver ASSIST solution includes Hepatic VCAR and FlightPlan for Liver that can be used independently. It also requires an AW workstation with Volume Viewer and Volume Viewer Innova. These applications are sold separately.

**INTERACT Active Tracker is an electromagnetic tracker-based solution allowing live Ultrasound automatic fusion with Cone Beam CT, as well as pre-operative CT, MR and PET volumes for effective needle procedures in the interventional suite. INTERACT Active Tracker may not be available in all markets. INTERACT Active Tracker is an optional feature of 3DXR (part of GE Interventional x-ray systems Innova IGS 5, Innova IGS 6 and Discovery IGS 7 or Discovery IGS 7OR). This feature supports only one 'Active Tracker' type: OmniTRAX Active Patient Tracker (sold separately by CIVCO). 3DXR may not be available in all markets. Refer to your sales representative.

1. Comparisons between RFA and MWA for the treatment of liver metastases, most often colorectal liver metastases, have shown that both produce different clinical outcomes in local tumor progression (2%-60% for RFA versus 9.6%-14.5% for MWA), median survival (10.9-60 months for RFA and 9-41.8 months for MWA), and 3-year survival rates (37-77% for RFA and 32-70% for MWA) a,b,c.
   a. Meloni MF, Chiang J, Laeseke PF, et al. Microwave ablation in primary and secondary liver tumours: technical and clinical approaches. Int J Hyperthermia. 2017 ;33(1) :15-24. doi :10.1080/02656736.2016.1209694.
   b. Sotirchos VS, Petrovic LM, Gönen M, et al. Colorectal Cancer Liver Metastases: Biopsy of the Ablation Zone and Margins Can Be Used to Predict Oncologic Outcome. Radiology. 2016;280(3):949-959. doi:10.1148/radiol.2016151005.
   c. Ryan MJ, Willatt J, Majdalany BS, et al. Ablation techniques for primary and metastatic liver tumors. World J Hepatol. 2016;8(3):191-199. doi:10.4254/wjh.v8.i3.191.

2. https://www.ncbi.nlm.nih.gov/pubmed/26246215
   Hyun et al, Early Stage Hepatocellular Carcinomas Not Feasible for Ultrasound-Guided Radiofrequency Ablation: Comparison of Transarterial Chemoembolization Alone and Combined Therapy with Transarterial Chemoembolization and Radiofrequency Ablation. Cardiovasc Intervent Radiol. 2016 Mar;39(3):417-25. doi: 10.1007/s00270-015-1194-0

3. Cornelis et al. Hepatic Arterial Embolization Using Cone Beam CT with Tumor Feeding Vessel Detection Software: Impact on Hepatocellular Carcinoma Response. Cardiovasc. Intervent. Radiol. 2017
The Statements described here are Dr. François Cornelis' professional opinions.

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