

# Usefulness and Safety of a Radial Approach in Hepatic Arteriography Transcatheter Arterial Chemoembolization based on Experience of Introduction

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Under the philosophies of patient-oriented medical care and the provision of high-quality medical care, the hospital has the basic policy of thorough and understandable explanations of the method, meaning, effect, risks, expected outcome, and costs of treatments from doctors to patients before obtaining consent, aiming at medical care based on confidential relationships with patients.



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Graduated from Nagoya University. Specialized in hepatic diseases and IVR.  
Dr. Toyoda has played an active role at Department of Gastroenterology, Ogaki Municipal Hospital with its history of 40 years.

### All clinical practices evolve toward minimal invasiveness

While the introduction of the radial approach is also being attempted in hepatic arteriography/transcatheter arterial chemoembolization (TACE), the introduction of the new procedure in daily clinical practice requires great effort. Yet, it is important to introduce new techniques in a timely manner and identify the overall trend in medical care. Dr. Toyoda explains: "All clinical practice evolves toward minimal invasiveness while seeking a greater effect. About 30 years ago, a cholecystectomy was the only surgical procedure performed laparoscopically. I remember that when it was first introduced, surgeons were reluctant to attempt the procedure and complained about having to perform such a complicated procedure. They said, 'A laparotomy is safer and easier!' But currently, almost all surgeries are performed laparoscopically in the large intestine, liver, and stomach, in addition to the gallbladder, as well as the pancreas in some cases. As for gastroscopy, transnasal endoscopy has been introduced and is now an essential procedure, although it was unpopular among endoscopists at first. This draws me to the conclusion that minimally invasive procedures will eventually be accepted in all fields. Safety is no longer justification for putting an unnecessary greater burden on patients. Based on this trend, I decided to introduce radial TACE to our hospital."

### Six months and 40 to 50 cases are required to master it perfectly

Then, what steps are required to introduce a new procedure, and how long does it take? Dr. Toyoda introduced Radial TACE in October 2017 and shared his experience: "First, I visited doctors who already had experience with the procedure to see how they performed it. Then, I was given detailed knowledge and taught the required devices and instruments. For example, I learned through this field tour that local anesthesia should be applied at the lowest dose possible to facilitate the radial artery puncture. I would not have acquired this detailed knowledge without a field tour. Through the field tour, I was able to visualize our team

performing this procedure. We then started to prepare for its introduction in our hospital. Based on the learning curve, I think it took about six months to master the procedure at a proficiency level equal to a femoral artery approach. In our hospital, it took about six months and 40 to 50 cases to bring the time required for a radial procedure in line with a femoral procedure. After mastering the procedure, we could perform the radial TACE in a procedure time similar to the time for the femoral TACE. Additionally, until we became familiar with the procedure, we had to think about the placement of the devices in the angiography room, and take care to avoid compromising the sanitary environment or dropping the instruments. Now, in addition to field tours, there are training videos, training models and other tools available to learn the procedure step by step.

### Radial TACE is friendly to both patients and medical staff

Minimal invasiveness is the current trend. In a study<sup>1)</sup> involving 36 patients who underwent both TACE via the radial approach and TACE via the femoral approach, 29 patients (81%) preferred the radial approach<sup>1)</sup> (Table 1). But how do actual patients and medical workers evaluate this approach? Dr. Toyoda replies: "Patient satisfaction with radial TACE is very high. We conducted a survey of patients who experienced angiography with femoral TACE and then newly underwent angiography with radial TACE. Before, during, and after the treatment, we asked them 'Which would you select for the next treatment, femoral or radial TACE?' 91.7% preferred radial TACE in total. During the treatment, 71.2% preferred radial TACE, and 97.3% preferred radial TACE after treatment. In the next treatment, 94.5% answered that they wanted radial TACE. We can conclude that radial TACE is definitely more favorable for patients. In addition, since TACE has to be performed multiple times in many cases, radial TACE reduces the feeling of hesitation for the next procedure. The patients can walk immediately after the procedure, reducing the burden on patients. This is another reason for the recommendation."

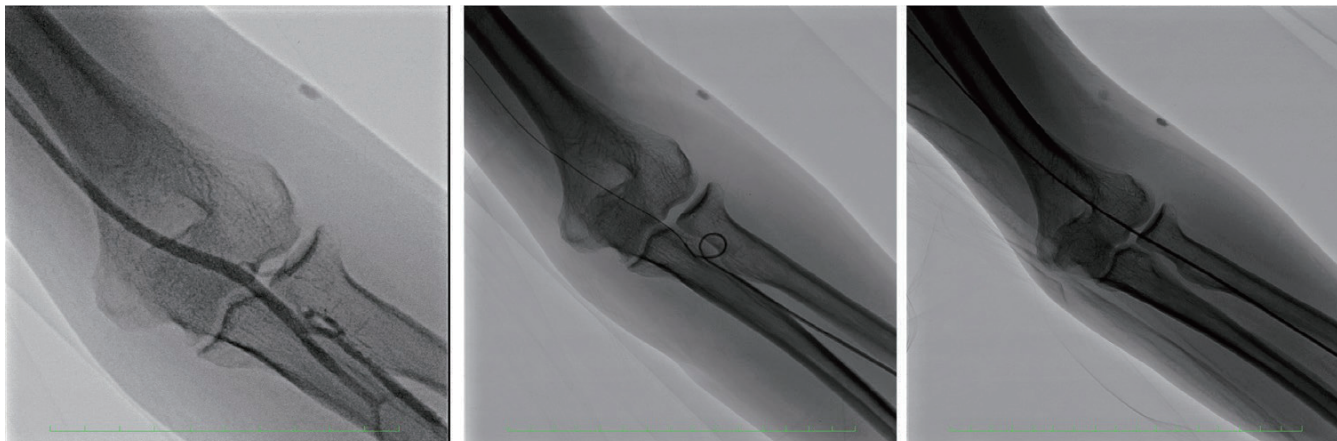


**Fig.1** Images of the procedure performed with the left hand opened and the space secured.

Comparison between TRA and TFA			
Detail	TFA	TRA	P Value
Patient preference	7	29	< 0.001
Bruising	8 (53)	16 (71)	0.11
Procedure time (min)			0.70
	Median	53.9	57.49
	SD	20.4	49.56
Radiation dose to patient (air kerma; mGy)			0.229
	Median	1,200.5	811
	SD	107-3479	80-5458
Radiation dose to operator (mrem)			0.01
	Median	13	5.5
	SD	1-121	1-43

**Table 1** Among 36 cases undergoing TACE, 29 cases preferred the radial TACE. Partially adapted data from a foreign article.<sup>1)</sup>

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**Fig.2** Cases requiring attention. The brachial artery is tortuous.

On the other hand, how do medical staff evaluate radial TACE? “Radial TACE is also advantageous for the operators because it reduces the burden on the staff. Burdens on the staff have definitely decreased, although subtle, because no pressure hemostasis is required, and the patients can enter and leave the angiography room in a wheelchair or by walking, for example. With femoral TACE, the patient has to undergo pressure hemostasis in the angiography room, return to the ward on a stretcher, and then rest in bed for a while to stop the bleeding. With radial TACE, no pressure hemostasis but only the use of a TR Band is required. The TR Band causes no distress even after long-term use. This is very important, actually, because patients administered antithrombotic drugs, such as warfarin and clopidogrel, can also undergo the procedure with no drug withdrawal. We usually conduct hemostasis for four hours with the TR Band, and for patients administered antithrombotic drugs, we continue hemostasis with the TR Band until the next day. No problems have occurred with this operation so far. Concerns are often expressed about the difficulty in the procedure via the radial approach. There is no difference in the TACE procedure itself, except the difference in the insertion of the guide catheter.

## Safety is comparable to that of femoral TACE

Safety must not be forgotten. Minimal invasiveness must not cause problems with safety. Dr. Toyoda: “First of all, no cerebral infarctions occurred in the 300 cases experienced in our hospital. Since the cases have been followed up for a short period, it cannot definitely be concluded that the procedure is safe. However, it has already been reported that the radial procedure is not associated with higher risks in cardiovascular angiography<sup>2),3)</sup> or in abdominal angiography either.<sup>4),5)</sup> The risks cannot completely be eliminated but may be within the acceptable range. No nerve injury associated with the puncture has occurred so far either. The puncture seems uneventful because no major nerve runs near the radial artery, and only a puncture is performed. Cases requiring attention include cases with a tortuous brachial artery (Fig.2) because catheter insertion is difficult. In such cases, care should be taken while inserting and advancing the guide wire and the catheter to the aortic arch. On the other hand, insertion through the radial approach is easy in some cases, for example, cases with a tortuous descending aorta distal to the bifurcation of the superior mesenteric artery (Fig.3). Such cases are found more often than expected.”

Finally, Dr. Toyoda stated, “I think angiography alone via the radial approach may be performed within one day. I think the patient may wear a TR Band, return home on the day of the angiography, and visit the outpatient clinic to have the band removed the next day. This may be suitable in the era of the COVID-19 pandemic.” We would like to expect popularization of radial TACE in the future.



**Fig.3** An example of tortuous descending aorta

### [References]

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Generic name: Compression instrument for hemostasis

Trade name: TR Band

Medical device notification code: 13B1X00101000001

Generic name: Compression instrument for hemostasis

Trade name: Special air volume adjuster for the TR Band (not sterilized product)

Medical device notification code: 13B1X00101000002