



Experience with Transradial and Transulnar Abdominal Angiography and Intervention.

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1. Purpose

In coronary angiography and angioplasty, transradial approach ([\[ā, 'ā\] ©ā, āā %2.jpg](#) TRA) has currently been accepted as an alternative catheterization method to transfemoral (TFA) or transbrachial approach (TBA). We started abdominal angiography and intervention transradially in 1999. We have reported its clinical experience at SIR. And we have also started transulnar approach (TUA) in patients with weak radial pulsation in 2002. The purpose of this study is to report practical and clinical applicability of these methods in abdominal angiography and intervention.

2. Material and methods

Between February 1999 and August 2006, 382 abdominal examinations were tried transradially or transulnarly in 225 cases. 151 cases were liver or gall bladder tumor, 48 cases were other abdominal tumor, 26 cases were gastrointestinal bleeding or aneurysm, 3 cases were renal or superior mesenteric arterial thrombosis and 1 case was ulcerative colitis. 310 examinations were with transarterial embolization. ([\[ā, 'ā\] ©ā, āā %1.jpg](#) Table1 , [\[ā, 'ā\] ©ā, āā %5.jpg](#) Table2)

Methods:

1. Before procedure, Allen's test was done to assess radial or ulnar arterial circulation of the hand. In some cases of weak radial pulsation, ulnar puncture was done. If both arterial pulsation was extremely weak, ipsilateral brachial puncture or contralateral radial puncture was chosen.
2. 1 tablet of Diclofenac Sodium 25mg or 1 tablet of Diazepam 5mg was taken per orally almost one hour before examination.
3. Under local anesthesia, left radial or ulnar artery was punctured with 20G 4cm plastic needle and a 4F 23cm long introducer was inserted.
4. Intravenous injection of 2,000-3,000 units of heparin was done.
5. A 4F 120cm long [\[ā, 'ā\] ©ā, āā %3.jpg](#) TOMO1 or JL4 catheter was proceeded to descending aorta and selective catheterization was done. TOMO1 catheter is designed for inserting left gastric artery or inferior phrenic artery (Fig.2). Superselective catheterization was done with guidewire directing method or with 2.4F 150cm long microcatheter.
6. After examinations, puncture site was compressed by [\[ā, 'ā\] ©ā, āā %4.jpg](#) compression instrument (Radispo.Xemex) for 6 hours (Fig.3). We did not compress manually. Patients were free from bed rest just after the examination.

3. Results

1. Puncture:

Radial puncture was failed in 12 examinations (3.0%) and changed to ipsilateral brachial puncture. 5 examination were tried ulnar puncture because of weak radial pulsation. 29 cases were examined twice, 19 cases were examined 3 times, 10 cases were examined 4 times, 8 cases were examined 5 times, 2 case was examined 6 times, 5 cases were examined 7 times, 1 case was examined 9 times and 1 case was examined 10 times during this period transradially ([\[ā, 'ā\] ©ā, āā %6.jpg](#) Table3). Though 3 patients (0.8%) was complained forearm pain at insertion of the introducer to radial artery, some of them did not complain forearm pain at next examination.

2. Catheterization & intervention:

In early days, catheter buckling to ascending aorta was sometimes seen. In 2 cases, pigtail catheter was needed to proceed guidewire to descending aorta. After we started to use TOMO1 or JL4 catheter, no catheter exchange was needed to proceed catheters to descending aorta. Selective catheterization was successful in all patients as we did transfemorally. In HCC patients, superselective catheterization to subsegmental branches and transarterial chemoembolization were done. Catheters were easily inserted to replaced right hepatic artery, right inferior phrenic artery and left gastric artery using TOMO1 catheter except some difficult cases.

In 2 cases of superior mesenteric arterial branch aneurysm, one case of hepatic arterial aneurysm and one case of splenic arterial pseudoaneurysm, successful coil embolization was done. In one case of renal angiomyolipoma, embolization with absolute ethanol using balloon occlusion method was done successfully.

Femoral approach was needed for superselective catheterization another day in 2 cases. In one case of omental arterial aneurysm, femoral approach was needed for complete embolization another day because microcatheter was not long enough to

reach one of the feeding arteries. (Case1)

3. Complication:

No puncture site hematoma was seen after examinations. Subcutaneous hemorrhage was sometimes seen in patients with severe liver cirrhosis after removal of tourniquet. Though no radial arterial stenosis was noted just after the procedure, weak radial pulsation was found in 5 cases at next examination (1.3%). And 3 cases were examined transulnarly and 2 case was examined transbrachially at next examination. No radial arterial obstruction or thrombosis was noted. No cerebrovascular trouble was noted.

4. Clinical cases (Difficult cases):

Case1: [\[ã. 'ãž©ã. ðãž%07.jpg\] Fig1](#) , [\[ã. 'ãž©ã. ðãž%08.jpg\] Fig2](#)

Case2: [\[ã. 'ãž©ã. ðãž%09.jpg\] Fig1](#) , [\[ã. 'ãž©ã. ðãž%10.jpg\] Fig2](#) , [\[ã. 'ãž©ã. ðãž%11.jpg\] Fig3](#) , [\[ã. 'ãž©ã. ðãž%12.jpg\] Fig4](#)

4. Conclusion

Discussion:

After we started TRA, 55 to 88 % of procedures were done with TRA in each year. Most of the patients examined with TFA or TBA were hemodialysis patients as nephrologists asked us not to examine transradially (Table 1).

TRA has recognized as a low invasive and safe catheterization method in cardiac angiography and intervention. Advantages of this procedure are low incidence of puncture site trouble and few limitation of patient's movement after the procedure. Patients are free from bed rest just after the examination. Disadvantages of this procedure are technical difficulty using long sized equipments, technical difficulty to puncture small arteries and potential risk of cerebrovascular trouble during the examination. Technical difficulty can be solved to be familiar with this procedure and using appropriate equipments.

Cerebrovascular trouble could be a critical event if it happens. We think that cerebrovascular trouble can be prevented with systemic heparinization during the procedure and avoiding frequent catheter exchange during procedure.

Though radial artery is rather small artery, incidence of arterial injury is not high. In most of the cases, we can use radial artery several times. We could puncture 10 times in one case. As radial arterial stenosis happened in about 1.4% of cases, pre-procedural assessment is important. Ipsilateral brachial or contralateral radial approach should be chosen at that time.

Conclusion:

In our experience, abdominal angiography and interventions can be performed safely, effectively and comfortably with TRA and TUA. We believe that these procedures should be an alternative catheterization methods in wide variety of angiographic examinations.

5. References

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- 2) Campeau L: Percutaneous radial approach for coronary angiography. *Cathe cardiovasc diagn* 16: 3-7, 1989.
- 3) Otaki M: Percutaneous transradial approach for coronary angiography. *Cardiology* 81: 330-333, 1992.
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6. Mediafiles:

スライド 1.jpg

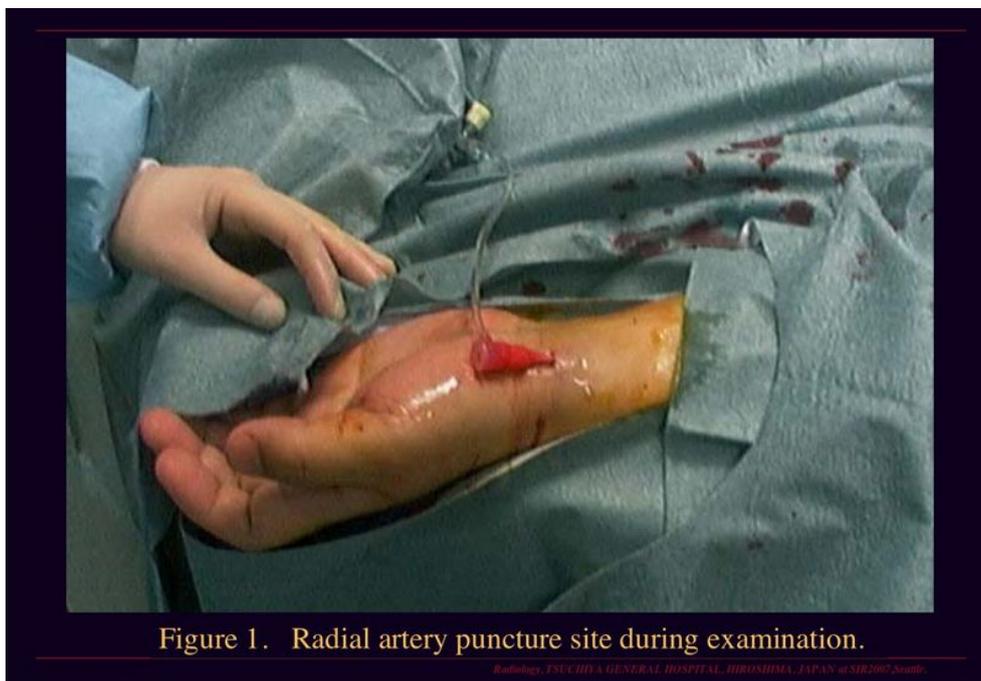
Table 1. Change of approach methods in abdominal angiography and intervention in our hospital.

	1998	1999	2000	2001	2002	2003	2004	2005	2006 1-8	total
TFA	33 (53%)	8 (11%)	11 (15%)	12 (16%)	4 (5%)	8 (11%)	0	5 (7%)	2 (6%)	83 (14.1%)
TBA	29 (47%)	14 (20%)	6 (8%)	6 (8%)	22 (28%)	9 (13%)	7 (12%)	11 (16%)	13 (39%)	117 (19.9%)
TRA		49(2) (69%)	57(2) (77%)	55(1) (76%)	51(3) (64%)	52 (73%)	50(1) (88%)	50(3) (75%)	18 (55%)	382(12) (65%)
TUA					2(1) (3%)	2 (3%)	0	1 (1%)	0	5(2) (0.9%)
total	62	71	74	73	79	71	57	67	33	587

Number of examinations, ():Failed radial or ulnar puncture

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スライド 2.jpg



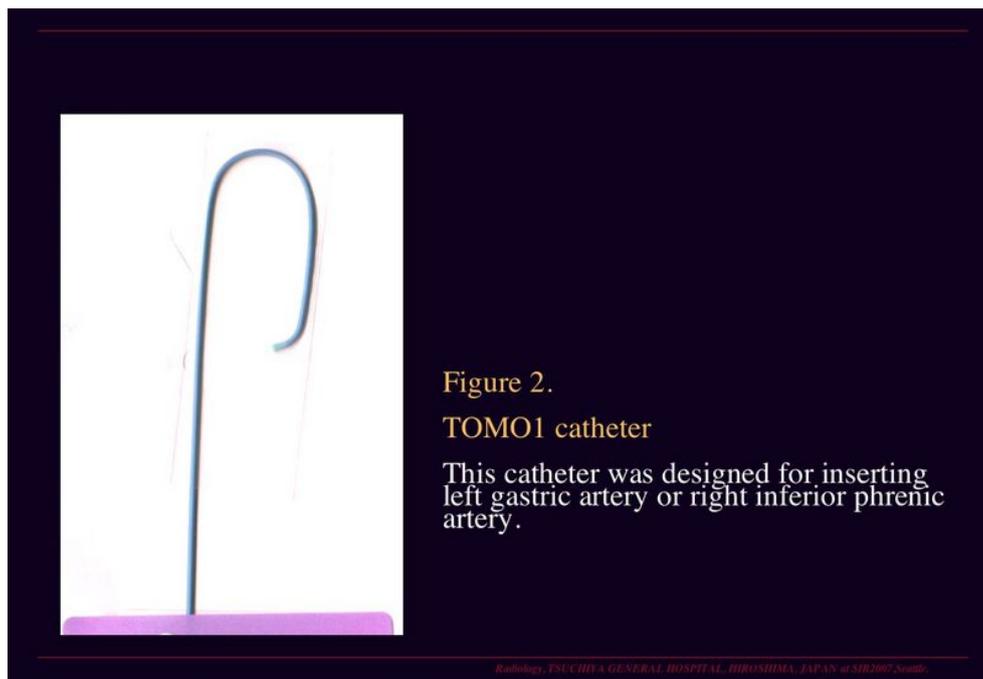


Table 2. Patients characteristics.

	Liver GB Bile duct	Gastro- intestinal tract, omentum	pancreas	kidney	others	total
tumor	148	16	20	11	1	196
thrombosis		2		1		3
aneurysm	2	4	1	1	1	9
bleeding	1	16 +1UC				18
total	151	39	21	13	2	226

(Number of cases)

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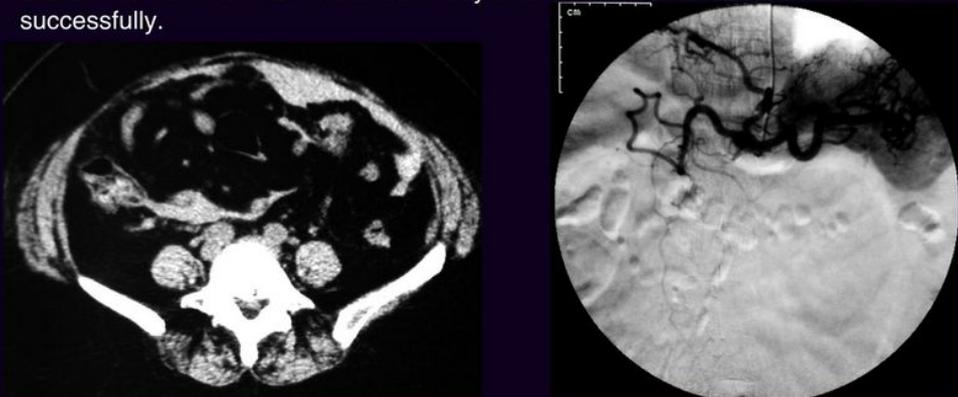
Table 2. Number of radial arterial puncture in each patient.

Radial puncture times	1	2	3	4	5	6	7	8	9	10
Radial puncture cases	150	29	19	10	8	2	5		1	1

(Number of cases)

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Case 1. 58 years-old female patient with abdominal pain. Lt abdominal hematoma was found on CT. Dilated omental artery was found. Feeding artery was branched from splenic artery (red arrows), gastroepiploic artery (blue arrows) and middle colic artery. Feeding artery from splenic artery and gastroepiploic artery was embolized with microcoils transradially. Feeding artery from middle colic artery could not be embolized as microcatheter was short. We have to examine another day with TFA and embolization was done successfully.



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Feeding artery from middle colic artery was too long to insert microcatheter transradially.

Femoral procedure another day. Embolization was done successfully.

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Case 2.

60 years-old male. Ruptured HCC was found and TAE of LHA was done. Tumor regrowth and perihepatic dissemination was found on follow up CT. Multiple tumor was found not only hepatic arteriographies but also leftgastric, inferior phrenic and right gastroepiploic arteriographies.



Before TAE

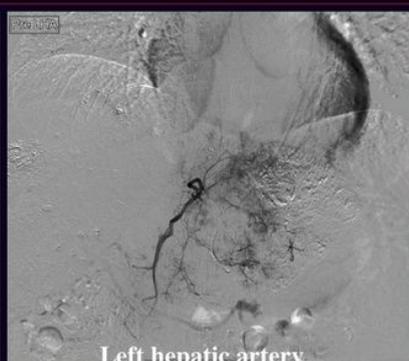


Celiac artery

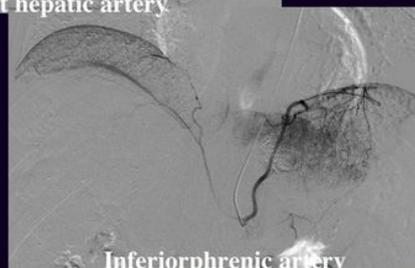
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Right hepatic artery



Left hepatic artery



Inferiorphrenic artery

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スライド11.jpg



スライド12.jpg

