

Digital subtraction venography using a stepping-gantry technique for venous mapping prior to hemodialysis vascular access creation

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Objectives:

Upper extremity venography is one of the methods usually used in venous mapping for further optimization of the surgical strategy. With reduction in dose of contrast media and radiation, preservation of venographic image quality is valuable although a challenge in clinical applications.

We introduce a new bolus tracking venography method using a stepping-gantry technique for venous mapping before hemodialysis vascular access creation.

Methods:

Between January 2012 and October 2012, we analyzed the digital subtraction venography data sets of ten patients with end-stage renal disease (ESRD). Digital subtraction venography using a stepping-gantry technique represents a simple modification of the conventional stepping-gantry angiography applicable to the upper extremity. The examinations were reviewed by two radiologists in order to ascertain the opacification quality of the venographic images. We also assessed the amount of the dose of contrast media used as well as the radiation exposure dose during the venography.

Results:

Two radiologists examined the opacification quality, and more than 84% of the analyzed veins of the patients were graded as good regarding visualization of the cephalic vein of the forearm, the cephalic and basilic veins of the upper arm, and the subclavian vein. The average dose of contrast medium used in ten patients was 10.6 mL (range 10-12 mL), and the mean accumulated dose during the examination was 3.5 mGy (range 2-5.2 mGy).

Opacification quality	Poor	Fair	Good	Patients number	gender	Age (year)	creatinine Level (mg/dL)	Operative methods	Dose of CM (mL)	Exposure (mGy)	Opacification quality of CV	Occlusion of CV
Cephalic vein of forearm	1	3	6	1	Male	74	3.73	AVG	10	2.2	Poor	No
Basilic vein of forearm	7	0	3	2	Female	87	6.8	rcAVF	10	3.3	Good	No
Cephalic vein of upper arm	0	4	6	3	Male	59	8.21	rcAVF	10	2.1	Fair	No
Basilic vein of upper arm	0	0	10	4	Male	78	3.01	rcAVF	12	2.6	Good	No
Axillary vein	0	0	10	5	Male	58	4.53	rcAVF	12	3.6	Good	Yes
Subclavian vein	0	0	10	6	Male	64	5.05	rcAVF	10	2.0	Good	No
Brachiocephalic vein	0	1	9	7	Female	76	5.8	AVG	10	2.2	Fair	Yes
SVC	1	5	4	8	Male	74	6.84	AVG	10	2.1	Fair	Yes
				9	Male	65	14.49	AVG	12	1.6	Good	Yes
				10	Male	61	5.6	AVG	10	1.7	Good	Yes

Conclusions:

Preliminary findings indicates that single bolus stepping-gantry venography may be a valuable and alternative method for venous mapping prior to hemodialysis vascular access creation as it uses less contrast media and reduces the radiation dose.

References:

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