

Incidence and risk factors of contrast-induced nephropathy after transcatheter arterial chemoembolization in hepatocellular carcinoma

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Objectives

● The purpose of this study was to investigate incidence and risk factors of contrast-induced nephropathy (CIN) after transcatheter arterial chemoembolization (TACE) in patients with hepatocellular carcinoma (HCC).

Methods

● We retrospectively reviewed medical records of 461 consecutive TACE sessions in 260 patients between January 2003 and October 2015.

● CIN was defined as an increase in serum creatinine levels by ≥ 0.5 mg/dl or $\geq 25\%$ from baseline within 72 hours after TACE¹⁾.

● Low-osmolality contrast medium, iopamidol, was administered in all the patients.

Results

Table 1. Baseline clinical characteristics

	All Patients (n = 461)	No CIN (n = 440)	CIN (n = 21)	P
Age (years)	70.5±9.0	70.4±9.0	73.1±8.5	NS
Sex (Male)	366(79.3%)	350(79.5%)	16(76.1%)	NS
HBsAg(+)	53 (11.4%)	53 (12.0%)	0 (0)	NS
Diabetes mellitus	132 (28.6%)	125 (28.4%)	7 (33.3%)	NS
Body mass index (kg/m ²)	23.2±3.6	23.3±3.6	22.3±2.8	NS
Volume of contrast medium (ml)	77.8±34.8	78.1±34.7	70.7±36.9	NS
Hemoglobin (g/dl)	12.2±2.0	12.3±2.0	11.3±2.3	P<0.05
Tumor size >5cm	70(15.1%)	60 (13.6%)	10(47.6%)	P<0.05
Number of tumor multiple	370 (80.2%)	351 (79.7%)	19 (90.4%)	NS
Creatinine (mg/dl)	0.81±0.25	0.81±0.24	0.91±0.34	NS
eGFR (mL/min/1.73m ²)	73.5±21.6	73.8±21.1	68.6±30.7	NS
Child-Pugh stage B·C	165(35.7%)	155(35.2%)	10 (47.6%)	NS
Total bilirubin (mg/dl)	1.0±0.6	1.0±0.6	0.9±0.6	NS
Albumin (g/dl)	3.6±0.5	3.6±0.5	3.4±0.4	NS
Prothrombin time (%)	72.2±14.8	72.2±14.8	72.7±15.5	NS
AST (U/l)	73.4±59.5	73.2±59.6	76.3±57.8	NS
ALT (U/l)	50.7±38.8	51.0±39.2	42.4±29.1	NS
CKD(+)	126 (27.3%)	116 (26.3%)	10(47.6%)	P<0.05

Continuous data shown as mean ± standard deviation
CKD, Chronic Kidney Disease. eGFR less than 60 ml/min/1.73 m².

- The incidence of CIN was 4.6% (21/461).
- One CIN patient required transient hemodialysis.
- In patients with CKD, CIN occurred more frequently than those without CKD (8.6% vs. 3.3%, respectively; p=0.03).

Conclusions

- In the present study, HCC size was an independent risk factor of CIN after TACE.
- The severity of liver cirrhosis was not associated the development of CIN in our study.

Table 2. Risk factors for CIN

(a) Univariate analysis

	No CIN (n = 440)	CIN (n = 21)	Odds ratio	95% Confidence interval	P
Hemoglobin (g/dl)	12.3±2.0	11.3±2.3	1.26	1.02-1.56	0.0271
Tumor size >5cm	60 (13.6%)	10(47.6%)	5.75	2.30-14.23	0.0003
CKD(+)	116 (26.3%)	10(47.6%)	2.53	1.03-6.17	0.0426

- Continuous data shown as mean ± standard deviation
- Odds ratio of hemoglobin was per 1 g/dL decrease.

● Factors below were not associated with CIN. Age, Sex, HBsAg, Diabetes mellitus, Body mass index, volume of contrast medium, Creatinine, eGFR, Child-Pugh stage, Total bilirubin, Albumin, Prothrombin time, AST, ALT, Number of tumors, Number of TACE sessions.

(b) Multivariate analysis

	P
Hemoglobin (g/dl)	NS
Tumor size >5cm	P<0.05
CKD(+)	NS

Discussion

In previous studies,

- The incidence of CIN was 3.2-23.8%²⁻⁵⁾.
- The severity of liver cirrhosis^{2,3,5,6)}, ascites⁴⁾, proteinuria²⁾, serum uric acid²⁾, abnormal baseline creatinine level⁴⁾, and number of TACE sessions⁵⁾ were reported as the risk factors for CIN after TACE.

References

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