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Letters

Acute renal failure after transarterial chemoembolization progressing to chronic renal failure in hepatocellular carcinoma

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Sir,

Hepatocellular carcinoma (HCC) has been widely treated with transarterial chemoembolization (**TACE**) by using various combinations of chemotherapeutic agents **and** embolic agents [1,2]. However, there have been no reports on the development of acute **renal failure** (ARF) after **TACE** in patients with HCC. We present a case of ARF after **TACE**, who did not recover normal **renal** function but instead progressed to chronic **renal failure**.

Case.

A 67-year-old female was admitted to hospital on July 2, 1998 with persistent nausea, vomiting **and** poor oral intake after **TACE** 9 days previously. On past history, she had been followed-up since 1993 due to liver cirrhosis by chronic viral hepatitis C infection. In May 1996, HCC of 4 cm size was detected on posterior inferior area of the right lobe of the liver **and TACE** was successfully performed with 30 mg of adriamycin without any complications. In June 1998, another 2 cm sized hepatic masses adjacent to the previous HCC were detected. She was admitted in June 18, 1998 for a second **TACE**. On admission, blood pressure was 130/70 mmHg, pulse rate was 88 per min, **and** body temperature was 36.3°C. There were no jaundice or ascites. White blood cell (WBC) count was 2200 cells/μl, haemoglobin (Hb) **and** haematocrit (Hct) were 10.7 g/dl **and** 30.5%, **and** platelets were 53 000 μl. Urinalysis was normal. Serum total protein was 5.3 g/dl, albumin 2.6 g/dl, total bilirubin 0.7

ng/dl, AST 84 IU/l, ALT 74 IU/l, alkaline phosphatases 100 IU/l, BUN 11.9 mg/dl, creatinine 0.8 mg/dl, sodium 147 mM, potassium 4.2 mM, prothrombin time 15 s (INR 1.44), activated partial prothrombin time 35 s (normal 23–33 s), **and** α-fetoprotein 287 ng/ml (normal<20 ng/ml). On abdominal computerized tomography, previous HCC with lipiodol uptake remained unchanged on segment 6 **and** low attenuated masses of 2×1.5 cm were found. Kidneys were normal. On the sixth hospital day, **TACE** with cisplatin 100 mg, lipiodol 10 ml, **and** gelfoam was performed on right posterior inferior branch of hepatic artery. Total duration of **TACE** was 2 h **and** 20 min. The patient complained of persistent nausea **and** vomiting 20 min after **TACE**, which was controlled with intravenous metoclopropamide injection. On the seventh hospital day, BUN 14.4 mg/dl, creatinine 1.0 mg/dl, total bilirubin 1.4 mg/dl, **and** AST **and** ALT were 98 **and** 72 IU/l respectively. She was discharged after 10 days in hospital but 5 days later she was readmitted due to persistent nausea, vomiting **and** severe weakness. On re-admission, blood pressure was 180/100 mmHg, pulse rate 64 per min, **and** body temperature 36.3°C. Skin turgor was poor **and** tongue was severely dry. Hb was 11.6 g/dl, Hct 37.2%, WBC 3600 cells/μl, platelet, 70 000 cells/μl, BUN 85.2 mg/dl, creatinine 4.3 mg/dl, AST 65 IU/l, ALT 53 IU/l, total bilirubin 2.2 mg/dl, amylase 153 U/dl, sodium 118 mM/l, potassium 3.0 mM, chloride 72 mM, prothrombin time 13.8 s (INR 1.18) **and** activated PTT 35 s. On arterial blood gas analysis, pH was 7.56, $PaCO_2$ 23.9 mmHg, PaO_2 118.4 mmHg, **and** HCO_3^- 21.3 mM. Urinalysis was normal. On spot urine analysis, sodium was 43.9 mM, potassium 32.1 mM, chloride 49.4 mM, creatinine 85.0 mg/dl **and** osmolality 452 mosm/kg. **Renal** ultrasonography **and** blood flow examination was normal. Despite adequate hydration serum creatinine did not return to normal from 4.3 mg/dl on the first day in hospital to 2.7 mg/dl on day 16. After discharge, serum creatinine rose to 4.0 mg/dl in September 1998, **and** the changes of serum creatinine until May 1999 are shown in Figure 1 a.

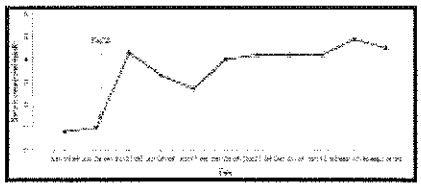

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Fig. 1 Serial changes of serum creatinine concentrations after **TACE**.

Comment.

Side effects of **TACE** include postembolization syndrome, abdominal pain, liver damage, **and** acute gastric mucosal lesions. Postembolization syndrome includes daily intermittent fever below 39°C, abdominal pain, nausea **and** vomiting, abdominal fullness, **and** appetite loss [2]. Those symptoms usually diminish spontaneously within a couple of weeks. A severe abdominal pain may result from gall bladder infarction resulting from cystic artery embolization, pancreatitis, gastroduodenal ulcer, or others. Liver damage is transient **and** liver function tests generally return to original level subsequently. Acute gastric mucosal lesions occur frequently **and** require medication.

TACE expose to several risks for the development of ARF. First, considerable amounts of radiocontrast are used for **TACE**. Thus, contrast media-associated nephrotoxicity can be developed in patients with volume depletion. In a number of patients with HCC, liver cirrhosis in which patients are vulnerable to the development of ARF are also present. Second, postembolization syndrome which includes fever, abdominal pain, nausea, vomiting, abdominal fullness, **and** appetite loss can induce volume depletion **and** thereby lead to the development of ARF. Third, acute hepatic **failure** during which ARF

frequently develops may occur after **TACE**. Fourth, **renal** infarction may occur by embolic materials.

In the present case, we could not perform **renal** biopsy due to patient's poor condition. There was no evidence of **renal** infarction. We suspect both the use of radiocontrast **and** the postembolization syndrome as possible causes of ARF in this case. The patient developed severe nausea, vomiting **and** appetite loss without adequate hydration after **TACE**. After discharge, she ate almost nothing due to vomiting for 5 days. Thus, prolonged volume depletion led to the development of pre**renal** ARF which progressed to ischaemic acute tubular necrosis **and** irreversible CRF. We could not find any report on ARF after **TACE** in MEDLINE search. This is, as far as we know, the first case of ARF after **TACE**. We suggest that the **renal** function of patients with HCC should be cautiously monitored after **TACE**.

References

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2. Yamada R, Kishi K, Sato M, Sonomura T *et al.* Transcatheter arterial chemoembolization (**TACE**) in the treatment of unresectable liver cancer. World J Surg1995; 19: 795–800[Medline]