CLINICAL STUDY

Safety and Feasibility of Same-Day Discharge of Patients with Hepatocellular Carcinoma Treated with Transarterial Chemoembolization with Drug-Eluting Beads in a Liver Transplantation Program

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ABSTRACT

Purpose: To evaluate the safety and feasibility of same-day discharge of patients with hepatocellular carcinoma (HCC) treated with transarterial chemoembolization with the use of drug-eluting beads (DEBs) and elucidate the prognostic factors for hospital admission.

Materials and Methods: A total of 266 DEB chemoembolization procedures in 154 consecutive patients listed for liver transplantation or identified for potential HCC downstaging were performed with the outpatient treatment protocol. Endpoints evaluated were admission to the hospital after the procedure for clinical reasons, readmission to the hospital within 1 month of the procedure, and procedure-related morbidity and mortality. In the evaluation of prognostic factors for admission, parameters of patients discharged the same day were compared with those of patients admitted overnight.

Results: Same-day discharge was feasible in 238 cases (89.5%), and 28 (10.5%) needed overnight admission. The main reason for overnight admission was postprocedural abdominal pain (n = 23; 67.8%). The procedure-related complication rate was 2.6%, and there were no readmissions or deaths during the first 30 days after chemoembolization. Chemoembolization performed for downstaging and the use of more than one vial of embolic agent were associated with an increased need for overnight admission ($P = .012$ and $P = .007$, respectively).

Conclusions: Same-day discharge of patients with HCC treated with DEB chemoembolization in a liver transplantation program is safe and feasible, with low complication and admission rates. Treatment for HCC downstaging and the use of more than one vial of embolic agent were associated with an increased need for hospital admission.

ABBREVIATIONS

BCLC = Barcelona Clinic Liver Cancer, DEB = drug-eluting bead, HCC = hepatocellular carcinoma, MELD = Model for End-stage Liver Disease

Orthotopic liver transplantation is a well established curative treatment for patients with hepatocellular carcinoma (HCC) whose disease meets the Milan criteria, with 5-year survival rates ranging from 70% to 80% (1–5). Transarterial chemoembolization with drug-eluting beads (DEBs) can be performed as a neoadjuvant procedure before liver transplantation in two situations, as a "bridging" or a downstaging method (4).

Most studies of patients with HCC who have received transarterial chemoembolization do not employ same-day discharge because of the risks of periprocedural complications (6–9). There are few studies of the safety and feasibility of same-day discharge of patients with HCC treated with chemoembolization (10,11), and these included patients in worse condition, with Barcelona Clinic Liver Cancer (BCLC) class C and D disease.

The purpose of the present prospective study is to evaluate the safety and feasibility of same-day discharge

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of patients with HCC after DEB chemoembolization and elucidate the prognostic factors for hospital admission. This is the largest such series described to our knowledge.

MATERIALS AND METHODS

This was a single-center, single-arm prospective study conducted at the hospital departments of interventional radiology and liver transplantation and approved by the local institutional review board.

Patients and Eligibility

From March 1, 2011, to February 28, 2013, a total of 266 DEB chemoembolization procedures in 154 consecutive patients with HCC were performed at a single institution with the outpatient treatment protocol. All these patients were part of the institutional liver transplantation program and were subjected to DEB chemoembolization for HCC downstaging or as a bridging strategy. A summary of patient demographic data is shown in Table 1.

The pretreatment evaluation included medical and physical evaluations, laboratory data, and imaging studies, including contrast-enhanced magnetic resonance imaging or triphasic computed tomography (CT). Child–Pugh and Model for End-stage Liver Disease (MELD) scores were calculated.

Table 1. Patient Demographics

Variable	Value
No. of procedures	266
No. of patients	154
Mean procedures per patient	1.72
Sex	
Male	118
Female	36
Mean age (y)	58
Child–Pugh class	
A	142
B	111
C	13
Thrombocytopenia*	
Yes	188
No	78
Tumor characteristics	
Single tumor	110
Multinodular	156
Pretransplantation status	
Downstaging	87
Bridging strategy	179
Etiology	
Hepatitis B	11
Hepatitis C	104
Hepatitis B/C	6
Alcohol	10
Alcohol/hepatitis	3
Other/unknown	20

*Platelet count $< 100{,}000/\mu L$.

The eligibility criteria included patients in the liver transplantation program, subjected to DEB chemoembolization for HCC downstaging (BCLC class B, including T1 and T2, N0, M0 cases) or a bridging strategy (BCLC class A disease), with no vascular invasion or extrahepatic spread. Patients with HCC not amenable to orthotopic liver transplantation because of clinical or tumor-related reasons were excluded.

Outpatient Treatment Protocol

Preprocedure Care. Before the intervention, all patients received intravenous hydration, 4 mg of ondansetron, 20 mg of esomeprazole, 20 mg of scopolamine, and 2 g of cefazolin. The first 39 patients also received 1 g of metamizole, a nonopioid analgesic drug that is used widely worldwide but is banned in some countries because of the risks of agranulocytosis. We then modified the preprocedure pain protocol and replaced metamizole with 20 mg of oxycodone.

DEB Chemoembolization Procedure. All procedures were performed under local anesthesia with lidocaine 2% plus sedation and analgesia with venous administration of midazolam (1–4 mg) and fentanyl (50–200 μg).

Intervention was performed through a femoral artery approach. Diagnostic superior mesenteric, celiac trunk, and common hepatic artery angiograms were obtained with a 5-F Cobra 2 or Simmons 2 catheter (Cordis, Bridgewater, New Jersey) to outline the hepatic artery anatomy, delineate the tumor and identify its feeding vessels, and evaluate portal vein patency. In cases of challenging anatomy, cone-beam CT imaging (XperCT; Philips, Best, The Netherlands) was performed to guide catheterization and evaluate tumor vascularization. The feeding vessels supplying the tumor were superselectively catheterized with a 2.8-F microcatheter (Progreat; Terumo, Tokyo, Japan), and the tumors were embolized with fluoroscopically guided injection of iodinated contrast medium mixed with one vial of 100–300-μm DEBs (DC Bead; Biocompatibles, Farnham, United Kingdom) impregnated with 50 mg of doxorubicin. Embolization endpoint was near-stasis observed in the artery directly feeding the tumor (ie, contrast agent column clearing within two to five heartbeats). If the endpoint was not achieved after the injection of loaded beads, additional bland embolization with 300–500-μm beads (Bead Block [Biocompatibles] or Contour [Boston Scientific, Natick, Massachusetts]) was undertaken with beads injected until the endpoint was reached. A suture-mediated closure system (Perclose ProGlide; Abbott Vascular, Redwood City, California) was available for femoral closure and was used in all patients.

Postprocedural Care. After the procedure, patients were observed in the same-day unit for 6 hours, with