Cure of Hepatoblastoma Through Transcatheter Arterial Chemoembolization

Tianyou Yang¹, Jiliang Yang¹, Tianbao Tan¹, Jing Pan¹, Chao Hu¹, Jiahao Li¹, and Yan Zou¹

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Introduction

Hepatoblastoma is the most common malignant liver tumor in children. Contrary to its adult counterparts (hepatocellular carcinoma [HCC]), hepatoblastoma is relatively rare, with a current rate of 1.2 to 1.5 cases/million population/year.¹ Surgery and chemotherapy remain the mainstay of treatment for hepatoblastoma. The main controversy between various study groups has been the issue of primary hepatic resection, with Childhood Liver Tumors Strategy Group (SIOPEL) recommending preoperative chemotherapy, whereas other study groups have traditionally held that some early PRETEXT stage groups are amenable to upfront resection.

Transcatheter arterial chemoembolization (TACE) is a practical and effective alternative for hepatic malignancies and is performed worldwide for adult patients with inoperable HCC.² However, in childhood hepatoblastoma, TACE is less frequently performed and is mainly used to shrink advanced-stage hepatoblastoma after initial systemic chemotherapy, thus allowing complete surgical resection.³,⁴

To our knowledge, the cure of hepatoblastoma by TACE alone has not been reported. Here, we report a case of hepatoblastoma cured by multiple TACE procedures.

Case Report

A 16-month-old boy presented with an abdominal mass, and computed tomography revealed a focal mass of the left liver, measuring 92.5 × 58 × 74.6 mm³ (Figure 1). The tumor was in close contact with the inferior vena cava at the second hilum and was considered not suitable for primary resection. The initial α-fetoprotein (AFP) level was 132 002 ng/mL. Subsequent computed tomography–guided percutaneous biopsy proved that it was a fetal type of hepatoblastoma. Neoadjuvant chemotherapy was proposed but rejected by parents. TACE was then discussed and accepted with written informed consent. TACE was performed with the Seldinger technique under general anesthesia. Hepatic arteriography showed that the tumor was supplied by the left hepatic artery and branch of the right hepatic artery. The feeding arteries were embolized with the use of a suspension mixed with cisplatin, pirarubicin, and iodized oil, followed by superselective embolization using polyvinyl alcohol. TACE was performed at 30-day intervals until the AFP level became normal. The AFP level constantly decreased and became normal after a total of 9 TACE procedures and remained normal thereafter. Serial ultrasound identified no tumor lesion during regular follow-up. Overall, the patient remained disease free for more than 6 years since the AFP level returned to normal.

Discussion

Hepatoblastoma is predominantly vascularized by the hepatic artery, whereas nontumor liver parenchyma is supplied mostly by the portal vein.²,³ These pathophysiological characteristics provide a unique advantage for TACE. TACE delivers chemotherapeutic drugs through the feeding artery of the tumor followed by administration of the embolizing agents. Embolization of the highly selected hepatic arteries causes tumor necrosis and prevents rapid washout of the chemotherapeutic drugs from the tumor, thus resulting in ischemic necrosis and enhanced cytotoxic destruction to the tumor.

¹Guangzhou Medical University, Guangzhou, China

Corresponding Author:
Yan Zou, Department of Pediatric Surgery, Guangzhou Women and Children’s Medical Center, Guangzhou Medical University, No: 9 Jinsui Road, Tianhe District, Guangzhou, 510623, China. Emails: monknut@126.com
High concentrations of the concomitantly used chemo-
terapeutic drugs are retained in the tumors for pro-
longed periods of time, thus allowing the locoregional
infusion to reach a drug concentration that could oth-
erwise not be achieved by conventional systemic delivery.
TACE provides dual attacks to hepatic tumors and has
proved valuable in the battle against primary and sec-
ondary hepatic malignancies in adults.5

Generally, TACE is a feasible and safe procedure
for the management of childhood hepatoblastoma and
is occasionally used when the tumor remains unresect-
able after preoperative chemotherapy.1,6-8 The treat-
ment strategy for this patient is not accord with current
guidelines, which demand upfront surgical resection
or preoperative chemotherapy plus delayed surgery.
However, it is encouraging to find that this patient was
completely cured through TACE alone. To our knowl-
dge, this is the first case of hepatoblastoma cured by
TACE alone. Hu et al9 reported the cure of an
advanced-stage hepatoblastoma with TACE and sys-
tematic chemotherapy. Yokomori et al10 reported that a
4-month-old infant with fetal type of hepatoblastoma
was cured with the infusion of chemotherapy drugs
through the hepatic artery. Together, all these reports
might challenge the established belief that surgical
resection is necessary to achieve long-term cure for all
hepatoblastomas.

The fetal type of pathology might also account for the
successful cure of this case. An inoperable fetal type of
hepatoblastoma was also cured with chemotherapy
alone.10 Pathology subtype is a significant prognostic
factor for hepatoblastoma, other than the PRETEXT
staging system, age, and AFP level. Among all the sub-
types of hepatoblastoma, pure fetal histology is unique
and prognostically favorable.11 Complete surgical
removal is enough for long-term cure.12 However, the
diagnosis of pure fetal histology requires evaluation of
the complete resection specimen prior to chemotherapy.11
This is not possible with small biopsies, which was
exactly the situation in our case.

As shown here, TACE seems to be very effective in
treating unresectable fetal type of hepatoblastomas.
TACE may be an option for such patients, and multiple
TACE procedures can be done until the AFP level
returns to normal. This method deserves further trials in
similar inoperable hepatoblastomas, especially those of
fetal histology type.

**Author Contributions**

TY: Contributed to conception and design; contributed to
acquisition; drafted manuscript; critically revised manuscript;
gave final approval; agrees to be accountable for all aspects of
work ensuring integrity and accuracy.

JY: Contributed to conception; contributed to acquisition and
interpretation; drafted manuscript; gave final approval; agrees
to be accountable for all aspects of work ensuring integrity and
accuracy.

TT: Contributed to acquisition and interpretation; drafted
manuscript; gave final approval; agrees to be accountable for all
aspects of work ensuring integrity and accuracy.

JP: Contributed to acquisition and analysis; drafted manu-
script; gave final approval; agrees to be accountable for all
aspects of work ensuring integrity and accuracy.

CH: Contributed to interpretation; drafted manuscript; gave
final approval; agrees to be accountable for all aspects of work
ensuring integrity and accuracy.

JL: Contributed to acquisition; drafted manuscript; gave final
approval; agrees to be accountable for all aspects of work
ensuring integrity and accuracy.
YZ: Contributed to conception and design; contributed to acquisition, analysis, and interpretation; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Declaration of Conflicting Interests
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