Global Pediatric Health
Volume 4: 1–3

DOI: 10.1177/2333794X17742750
journals.sagepub.com/home/gph
SAGE

Cure of Hepatoblastoma Through Transcatheter Arterial Chemoembolization

Tianyou Yang[1], Jiliang Yang[1], Tianbao Tan[1], Jing Pan[1], Chao Hu[1], Jiahao Li[1], and Yan Zou[1]

Received September 28, 2017. Accepted for publication October 3, 2017

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 mm^3 (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.

[1]Guangzhou 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

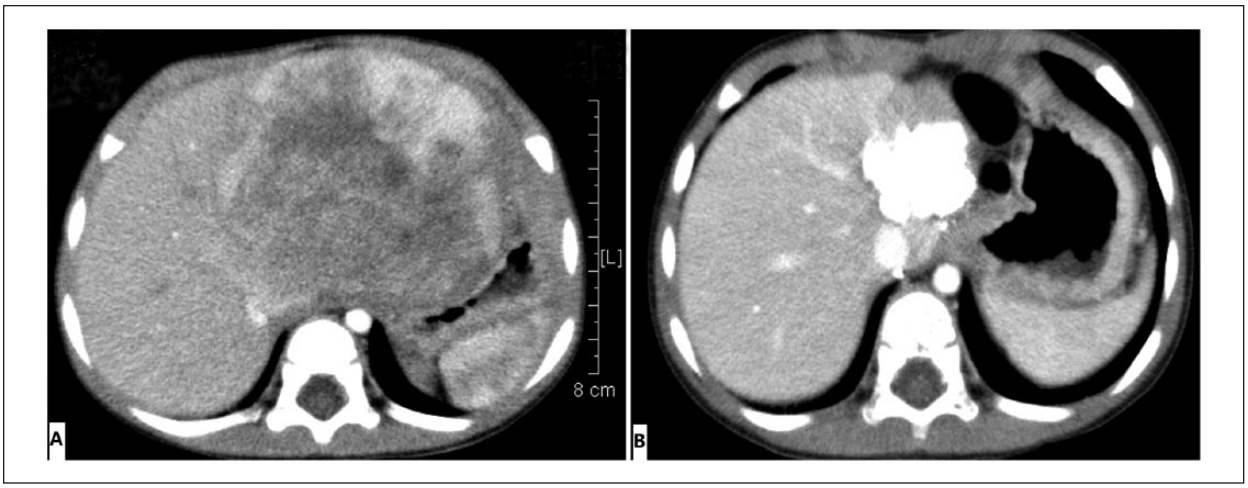

Figure 1. A. Computed tomography images before transcatheter arterial chemoembolization (TACE). B. Computed tomography images after the completion of TACE.

High concentrations of the concomitantly used chemotherapeutic drugs are retained in the tumors for prolonged periods of time, thus allowing the locoregional infusion to reach a drug concentration that could otherwise not be achieved by conventional systemic delivery. TACE provides dual attacks to hepatic tumors and has proved valuable in the battle against primary and secondary 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 unresectable after preoperative chemotherapy.[1,6-8] The treatment 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 knowledge, this is the first case of hepatoblastoma cured by TACE alone. Hu et al[9] reported the cure of an advanced-stage hepatoblastoma with TACE and systematic chemotherapy. Yokomori et al[10] 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 subtypes 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 manuscript; 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

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by National Natural Science Foundation of China (Grant Number 81602199), Guangzhou Science Technology and Innovation Commission (Grant Number 201607010395), and Natural Science Foundation of Guangdong Province, China (Grant Number 2016A030313496).

References

1. Czauderna P, Lopez-Terrada D, Hiyama E, Haberle B, Malogolowkin MH, Meyers RL. Hepatoblastoma state of the art: pathology, genetics, risk stratification, and chemotherapy. *Curr Opin Pediatr*. 2014;26:19-28.
2. Llovet JM, Real MI, Montana X, et al. Arterial embolisation or chemoembolisation versus symptomatic treatment in patients with unresectable hepatocellular carcinoma: a randomised controlled trial. *Lancet*. 2002;359:1734-1739.
3. Jiang XW, Li JH, Xu HL, Chen ZX. Combined treatment of hepatoblastoma with transcatheter arterial chemoembolization and surgery. *Pediatr Hematol Oncol*. 2006;23:1-9.
4. Vogl TJ, Scheller A, Jakob U, Zangos S, Ahmed M, Nabil M. Transarterial chemoembolization in the treatment of hepatoblastoma in children. *Eur Radiol*. 2006;16:1393-1396.
5. Lewandowski RJ, Geschwind JF, Liapi E, Salem R. Transcatheter intraarterial therapies: rationale and overview. *Radiology*. 2011;259:641-657.
6. Meyers RL, Tiao G, de Goyet JD, Superina R, Aronson DC. Hepatoblastoma state of the art: pre-treatment extent of disease, surgical resection guidelines and the role of liver transplantation. *Curr Opin Pediatr*. 2014;26:29-36.
7. Hirakawa M, Nishie A, Asayama Y, et al. Efficacy of preoperative transcatheter arterial chemoembolization combined with systemic chemotherapy for treatment of unresectable hepatoblastoma in children. *Jpn J Radiol*. 2014;32:529-536.
8. Malogolowkin MH, Stanley P, Steele DA, Ortega JA. Feasibility and toxicity of chemoembolization for children with liver tumors. *J Clin Oncol*. 2000;18:1279-1284.
9. Hu XL, Li JH, Jiang XW, Chen ZX. Cure of hepatoblastoma with transcatheter arterial chemoembolization. Pediatr Hematol Oncol. 2004;26(1):60-63
10. Yokomori K, Hori T, Asoh S, Tuji A, Takemura T. Complete disappearance of unresectable hepatoblastoma by continuous infusion therapy through hepatic artery. *J Pediatr Surg*. 1991;26:844-846.
11. Lopez-Terrada D, Alaggio R, de Davila MT, et al. Towards an international pediatric liver tumor consensus classification: proceedings of the Los Angeles COG liver tumors symposium. *Mod Pathol*. 2014;27:472-491.
12. Malogolowkin MH, Katzenstein HM, Meyers RL, et al. Complete surgical resection is curative for children with hepatoblastoma with pure fetal histology: a report from the Children's Oncology Group. *J Clin Oncol*. 2011;29:3301-3306.