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LIVER TUMORS IN CHILDHOOD

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Summary

Liver tumors count for approximately 2% of all childhood tumors and almost 70% of them are malignant. Most of them present as palpable abdominal mass. Correct diagnosis considering type, size and localization of the tumor is crucial for the right treatment strategy. Although surgical resection still remains the most important factor for survival, when combined with chemotherapy, the survival rates will raise. Liver transplantation is also considered in some cases of liver tumors.

From 1991 to 2008 we treated 13 children with liver tumors. Our experience together with the review of recent literature is presented here.

KEYWORDS: *liver tumors, hepatoblastoma, hepatocellular carcinoma*

TUMORI JETRE U DJEČJOJ DOBI

Sažetak

Tumori jetre čine ukupno 2% svih tumora dječje dobi, a preko dvije trećine su zloćudni. Većina se prezentira kao palpabilna tvorba u abdomenu. Za odabir ispravnog plana liječenja nužno je postaviti točnu dijagnozu i odrediti stupanj bolesti. Iako je kirurška resekcija i dalje najbitniji faktor prognoze, u kombinaciji s kemoterapijom postotak preživljenja značajno raste. U određenim slučajevima neresektabilnih tumora transplantacija jetre daje dobre rezultate.

Od 1991. godine do 2008. liječili smo 13 djece s tumorom jetre i u ovom radu prikazujemo naše rezultate uz pregled recentne literature.

KLJUČNE RIJEČI: *tumori jetre u djece, hepatoblastom, hepatocelularni karcinom*

INTRODUCTION

Hepatoblastoma and hepatocellular carcinoma are the most common primary liver malignancies in children (Table 1) (1).

Although etiology of liver tumors is in most cases unknown, hepatoblastomas are embryonal tumors which can sometimes be associated with conditions like Beckwith-Wiedemann syndrome, Fanconi's anemia and other. On the other hand, in patients with hepatocellular carcinoma underlying liver disease like hepatitis B or alpha-1 antitrypsin deficiency is often present. Both of these tumors occurs more often in boys but HB is more often found in younger children (less than 3 years of age) whereas HCC occurs in older children (over 11) (2). Typical presentation is abdominal mass in most of the cases and routine diagnostic assessment is well known and includes besides standard blood and liver tests an alpha-fetoprotein level and imaging studies. Chest x-ray (or CT scan) to exclude metastatic disease, ultrasound

Table 1.

OCCURRENCE OF PEDIATRIC LIVER TUMORS

Primary Pediatric Liver Tumors	
Tumor	Rate of Occurrence (%)
Malignant	
Hepatoblastoma	43
Hepatocellular carcinoma	23
Sarcoma	6
Benign	
Benign vascular tumors	13
Mesenchymal hamartoma	6
Adenoma	2
Focal nodular hyperplasia	2
Miscellaneous	5

and then CT or MR scan to determine size, location, relation to adjacent structures (mainly bile ducts and blood vessels), stage and to see if the tumor is resectable. Unfortunately, more than a half of all liver tumors are unresectable at the time of presentation. Hepatoblastomas are more often unilocular and located in the right lobe whereas hepatocellular carcinoma is multilocular and spread through the whole liver (3).

SIOPEL pretreatment staging is used for childhood liver tumors as shown in Figure 1. There are four stages and vascular invasion (portal vein or vena cava), metastases and extrahepatic extension are also documented.

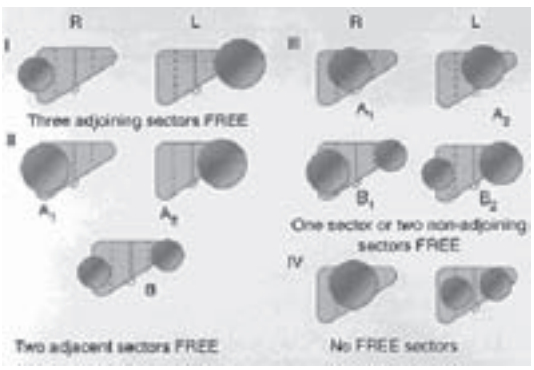

Figure 1. SIOPEL stages of liver tumors.

METHODS

From 1991 to 2008 at the Department of Pediatric Surgery, University Hospital Center Zagreb - Rebro, thirteen children with liver tumors were treated. There were ten boys and three girls, mean age was 4 years.

Table 2.

STAGING DISTRIBUTION OF OUR PATIENTS

	I.	II.	III.	IV.
Hepatoblastoma		4		2
Hepatocellular carcinoma		1		1
Sarcoma		1		1

All of them presented with palpable abdominal mass although after thorough and careful examination of every patient's history, we found episodes of either discomfort, pain, nausea or inapetency.

The following diagnostic procedures were used - αFP, ultrasound, CT-scan and MR-scan, biopsy.

We had six hepatoblastomas, two hepatocellular carcinomas, two sarcomas and one rhabdomyosarcoma, hamartoma and hemangioma. Malignant tumors staging is shown in Table 2 with one hepatoblastoma showing pulmonary metastasis and both hepatocellular carcinomas showed extrahepatic involment (portal vein and diaphragm). For hepatoblastoma, PLADO chemotherapy protocol was used in four cases and SIOPEL 3 in two cases. Four resectable hepatoblastomas received postoperative chemotherapy and stage IV tumors received both preoperative and postoperative treatment. One hepatocellular carcinoma was treated with SIOPEL 2 protocol (only postoperative) and another according to the FOLFOX 2 + PLADO both pre- and postoperatively. Both sarcomas received pre- and postoperative CWS-96 treatment. Two of our patients died (sarcoma and hepatocellular carcinoma) and follow-up period for other children range from four months to almost 17 years.

DISCUSSION

Many improvements considering survival in childhood cancer have been made during past decade (4). Because of the relative rarity of liver tumors in children multidisciplinary approach in forming the treatment strategy is mandatory – both experienced pediatric hepatobiliary surgeon and pediatric oncologist are equally needed to achieve the best results. Resection of the primary tumor is required whenever possible. Local resection of adjacent invaded structures like diaphragm

and resection of pulmonary metastases (depending on their number) is also recommended (5). The role of chemotherapy is essential – preoperatively used, a nonresectable tumor can become a resectable one, it can eradicate pulmonary metastases and multifocal lesions throughout the liver. Hepatocellular carcinoma unfortunatelly still responds poorly to chemotherapy in many cases. On the other hand, almost all children with hepatoblastoma are treated with chemotherapy (except stage I pure fetal forms) and some authors use it preoperatively even in resectable cases which according to them can reduce intraoperative complications (6, 7).

For benign liver tumors, complete surgical resection is curative and following the SIOPEL protocol, 5-year survival for hepatoblastoma is over 75% for all stages together and for hepatocellular carcinoma it is still only around 30% (8).

An additional tool in the treatment arsenal – liver transplantation for unresectable tumors is introduced recently and survival is significantly higher when transplantation is used primarily than as a salvage procedure (9, 10).

CONCLUSION

Surgical therapy remains the cornerstone of treatment of pediatric liver tumors. Chemotherapy both improves survival and also makes some tumors amenable to resection. In specific cases of unresectable tumors, liver transplantation should be considered. With the use of modern treatment options survival is significantly improved during the past decade, especially with hepatoblastoma compared to hepatocellular carcinoma.

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