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# Surgical options in complex treatment of focal liver lesions in pediatric patients

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**Introduction.** Hepatic tumors account for 1–4 % of the solid tumors in children.

**Aim.** Results assessment of surgery treatment for pediatric liver tumors.

**Materials and methods.** From April 2008 to December 2015, 81 pediatric patients (3 months – 17 years old) with a variety of focal liver lesions underwent surgery at Petrovskiy National Research Centre for Surgery. Malignancies (75.3 %) were presented by hepatoblastoma (66.7 %), undifferentiated (embryonal) sarcoma (3.7 %), hepatocellular carcinoma (2.5 %), malignant rhabdoid tumor (1.2 %) and rhabdomyosarcoma (1.2 %). Benign lesions or neoplasms (22.2 %) were presented by focal nodular hyperplasia (7.4 %), mesenhymal hamartoma (4.9 %), hepatocellular adenoma (2.5 %), infantile hemangioendothelioma (2.5 %), benign teratoma (2.5 %), cavernous hemangioma (1.2 %), inflammatory pseudotumor (1.2 %). Two patients (2.5 %) had a parasitic liver disease: cystic and alveolar echinococcosis.

**Results.** Surgical treatment consisted of anatomical resection (lobe- and extended lobectomies – 82.5 %, segmentectomies – 4.9 %, and living-donor liver transplantations – 12.4 %. In one case of cystic echinococcossis was made total pericystectomy. In groups of benign and parasitic diseases there were no deaths. The treatment's results for patients with the hepatoblastoma are presented below. The age of patients in this group ranged from 3 months to 17 years (median – 19.13; 25th and 75th quartiles – 10.53– 34.1 months). In 87 % of cases, the age did not exceed 4 years old. Patients classified by system PRETEXT: I – 2 % ($n = 1$), II – 39 % ($n = 21$), III – 31 % ($n = 17$), IV – 28 % ($n = 15$). In 13 children (24 %) detected lung metastases. In 2 cases hepatoblastoma developed on the background of Beckwith–Wiedemann syndrome. A biopsy of the tumor before treatment was performed in 31 (57.4 %) patients. Neoadjuvant chemotherapy performed in 54 cases (96 %). Tumor regression with reduction of the tumor stage were achieved in 7 patients (13.5 %). Progression of tumor and stage of the disease were found in 4 cases (7.7 %). Lung surgery due to the remote metastases required in 6 cases (11.4 %). In 89 % ($n = 48$) of patients performed anatomical resection of the liver and in 11 % ($n = 6$) – living related liver transplantation. Extended hemihepatectomies and bilateral liver resections were performed in 65 % ($n = 35$). All resection performed without Pringle maneuver. The volume of blood loss in patients with resection was 17.02 ± 14.67 ml/kg. Hospital mortality rate was 1.85 % ($n = 1$). Three patients (5.6 %) died for the first year after surgery. The causes of death were complications of adjuvant chemotherapy ($n = 2$) and pulmonary embolism during surgery for tumor recurrence ($n = 1$). One patient died after 15 months due to the progression of distant metastases in the lungs. The actuarial survival rate (overall/disease-free) for patients with hepatoblastoma was, respectively: 1 year 0.94 ± 0.03/0.84 ± 0.05; 3 years 0.89 ± 0.04/0.84 ± 0.05; 5 years 0.89 ± 0.04/0.84 ± 0.05; 7 years 0.89 ± 0.04/0.84 ± 0.05. In patients after resection the same results were higher: 1 year 0.96 ± 0.03/0.88 ± 0.05; 3 years 0.90 ± 0.05/0.86 ± 0.05; 5 years 0.90 ± 0.05/0.86 ± 0.05; 7 years 0.90 ± 0.05/0.86 ± 0.05.

**Conclusion.** Surgery is the preferred treatment of benign and malignant liver lesions in pediatric patients. Long-term results with high survival rates for combined treatment of hepatoblastoma demonstrate broad opportunities both resection and liver transplantation in cases of selection of optimal surgery plan and chemotherapy protocols.