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16 Cases Of Hepatoblastoma In Children: The Process From Diagnosis To Treatment

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Summary :
Hepatoblastoma is the most common primary malignant hepatic tumor of infancy and childhood, occurring predominantly in the first two years of life. Over the last 3 decades, the treatment has advanced, and neoadjuvant chemotherapy is now the standard of care for most cases. Prognosis is based on many factors including alpha-fetoprotein levels, age at the time of diagnosis, completeness of resection, and clinical stage of the disease.
This is a retrospective study of 16 cases of BH, between 2012 and 2022, with an average age of 20 months. All patients benefited from the ultrasound/CT couple for the diagnosis. The alfa fetoprotein level was high. almost all patients received chemotherapy followed by surgery . the evolution was marked by a complete remission in 10 cases
The aim of this study was to evaluate the clinical and paraclinical characteristics, treatment and survival of children diagnosed with hepatoblastoma (HB) and included in the SIOPEL 2 and 3 protocols.
keywords : *Liver tumor ; Hepatoblastoma ;Alfa-fetoprotein ; PRETEXT ; SIOPEL; surgery ; evolution*

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I. Introduction :

The median age at presentation of children affected by hepatoblastoma (HB), the most common childhood primary hepatic malignancy, is < 2 years with cases reported even at birth (1), and can be easily suspected by the discovery of a liver tumour associated with an increase in alfafetoprotein (AFP). Radiographic assessment, and the anatomopathological and biological results of the biopsy allow us to classify the disease, which is essential for adapting any treatment.The histologic types are subdivided into 2 broad categories: epithelial type and mixed type (2).

Neo-adjuvant chemotherapy and surgical resection produce a cure rate of approximately 70%, a vast improvement over the dismal 30% cure rate in the 1970s. This increase is largely due to advances in chemotherapy protocols, imaging modalities and surgical management (3,4) Prognosis is based on many factors including alpha-fetoprotein levels, age at the time of diagnosis, completeness of resection, and clinical stage of the disease (5), another factor in improved survival is hepatic transplantation, an option for children with unresectable disease (6).

II. Materials And Methods :

This is a retrospective study, spread over a period of 10 years between january 2012 and december 2022; about 16 cases of hb, collected in the department of pediatric visceral surgery, at the hassan ii hospital in fez, Morocco.

We retained some general data, including age at diagnosis, antecedents: family cancers and predisposing factors. We looked for the clinical signs revealing the disease, the diagnostic delay corresponding to the time between the appearance of the first symptom and consultation, the means by which the diagnosis was made, and also the evolution of patients after treatment.

III. Results :

The average age of patients was 20 months (with extremes ranging from 5 months to 7 years), and the average consultation time was 41 days. Tthe mode of onset : abdominal distension was found in all patients, 7 patients (43.75%) presented an altered general condition. 6 patients (37.5%) had a fever. 4 patients (25%) reported abdominal pain. Only 1 patient (6.25%) had jaundice. And the constant physical signs : Hepatomegaly

regarding para-clinical characteristics : the combination of ultrasound and CT allowed the diagnosis of hepatoblastoma to be made in all cases, the tumor most often located on the right side. It was hypodense in 14

cases, heterogeneous in 10 cases, containing calcifications in 5 cases and areas of necrosis in 4 cases. Tumour topography was pluri-segmental: 10 cases PRETEXT 2 , 04 cases PRETEXT 3, 01 cases PRETEXT 4. pulmonary metastases were found in 5 patients. AFP was elevated in 15 patients, with a mean value of 13260 ng/ml.

Anatomopathological study of the surgical specimen confirmed the diagnosis in all cases. Mixed hepatoblastoma was found in 56.25% of patients, epithelial hepatoblastoma in 18.75%, undifferentiated in 1 case, and unspecified in 2 cases (1 patient not operated and another who died intraoperatively).

Pre-operative chemotherapy is administered in all patients. The protocol used was SIOPEL 3, with an average tumor reduction of 40%. Post-operative chemotherapy was performed on all patients. For radical treatment, the approach is horizontal (right subcostal, with or without median line, depending on tumor location).

Hepatectomies were performed following the Western mode (pedicle ligation followed by resection). Partial hepatectomy was done in 14 patients, the tumor resection was impossible for one patient, due to the large size of the tumor, despite reduction chemotherapy. And 1 case died intraoperatively due to hemorrhagic shock.

Classification and anatomo-pathological study :

Accurate tumor staging is essential for risk stratification and therapy planning of hepatoblastoma.

Currently, the International Society of Pediatric Oncology (SIOPEL) has adopted the Pretreatment Extent of Disease (PRETEXT) classification, based on the location of the tumor(s) within the liver parenchyma, and the existence of vascular extension or metastases (7).

The PRETEXT classification is based on the number of tumor-free sectors, and aims to predict tumor operability:

PRETEXT I: 3 healthy adjacent sectors, only 1 invaded,

PRETEXT II: 2 healthy adjacent areas, 2 invaded areas,

PRETEXT III: 2 healthy non-adjacent areas or a single healthy area,

PRETEXT IV: no area free, all 4 areas invaded.

A tumour involving all 4 sectors of the liver classified as PRETEXT IV is a high-risk tumour. high-risk tumour.

The study of tumor extension should look for involvement of the vena cava and/or the 3 suprahepatic veins (V), the portal vein (P), and the presence of metastases (M).

Some cooperative groups still use other classification systems, making comparisons between studies difficult. For example, the North American COG group uses a classification based on the outcome of primary surgery (8).

In our series the classification adopted is PRETEXT with:3 cases PRETEXT 1, 10 cases PRETEXT 2, 3 cases PRETEXT 3

IV. Discussion :

Hepatoblastoma accounts for 2/3 of malignant liver tumors in children and adolescents adolescent (79% in children < 5 years and 66% in children < 20 years) (9), C'est une tumeur du petit enfant, à prédominance masculine ; L'âge moyen est de 18-24mois (10).

Dans notre étude, l'âge moyen de nos patients est comparable à celui des autres séries (20 mois), de même que la prédominance masculine.

There are different environmental risk factors associated with hepatoblastoma : Prematurity and low birth weight (11), drugs such as furosemide, radiation, plasticizers, and other toxins are incriminated (12,13)

Recent studies have shown that smoking (paternal and/or maternal) is a risk factor for hepatoblastoma, especially in parents who are regular smokers (13).

Hepatoblastoma may be associated with Wiedemann-Beckwith syndrome (14) and/or body hemi hypertrophy (15) , or with fetoalcoholic syndrome or trisomy 21 (Edward's syndrome) (12).

In our study, and in harmony with the literature,

increased abdominal volume is the dominant sign (16,17) that prompts parents to consult a specialist. however hepatoblastomas may be discovered following tumour rupture (18), or conversely, they may be silent.

Accompanying signs: abdominal pain or digestive disorders such as anorexia, postprandial discomfort and vomiting. General signs such as altered general condition and fever may be present. and rarely, an icterus.

In our study, icterus was present in only one patient.

hepatomegaly is an almost constant sign (18), and may be general or localized to a lobe, homogeneous or nodular, firm or hard in consistency.

When faced with a clinically suspicious liver mass, a number of questions arise concerning its nature: benign or malignant, primary or secondary. The paraclinical work-up, including biological, radiological and

anatomopathological examinations, helps to establish a positive diagnosis, eliminate certain differential diagnoses, and recommend an appropriate therapeutic approach.

AFP dosage has prognostic value, it helps to evaluate the response to treatment and monitor disease progression.

Abdominal ultrasound is the technique of choice for any abdominal mass in children ; Hepatoblastoma usually appears as a single, large, solid, and hyperechoic mass.

The tomographic appearance of hepatoblastoma is extremely variable and depending on the histological composition of the tumor. The lesion tends to appear hypodense spontaneously, sometimes with coarse calcifications (8). (figures 1 and 2)

Magnetic Resonance Angiogram (MRA) provides a better study of vascular invasion, which helps guide surgical resection (8).

In our study, 4 cases of pulmonary metastases were diagnosed on chest CT data, a result close to the literature, with an incidence of around 20% in trials from different oncology groups (19,20).

The most important advance in the management of children with hepatoblastoma has been the discovery of effective chemotherapy. Its aim is to reduce the tumor mass, making surgery easier, and to prevent metastases (12). Several drugs are used: cisplatinum, carboplatin doxorubicin (adriamycin) ,5 - fluorouracil, vincristine, etoposide, cyclophosphamide irinotecan.

Surgery remains indispensable for the treatment of HB, since to date no hepatoblastoma has been reported to have been cured without tumor excision.

The conditions defining the operability of a hepatoblastoma are (18) :

- possibility of resecting the entire tumour
- Preservation of a sufficient volume of healthy parenchyma.
- Preservation of arterial and portal blood supply, as well as biliary and suprahepatic drainage.

The surgical technique adopted consists of: making a horizontal incision under the right rib, ensuring hepatic mobility after section of the round, suspensory and triangular ligaments, careful dissection in respect of the inferior vena cava, the supra-hepatic veins and the various elements of the hepatic pedicle. after vascular clamping of the territory concerned, the tumourous liver is resected and haemostasis is ensured (figures 3, 4 and 5).

Liver transplantation is a possible alternative, insofar as the hepatectomy partial hepatectomy cannot be carcinological

The first transplant was performed by Starzel in 1963 in Denver (21), since then, the technique has developed considerably, and results have improved experience and the introduction of ciclosporin.

other therapeutic alternatives are possible, but have little place, such as radiotherapy, which is used in the treatment of incompletely removed hepatoblastoma with a limited dose and volume of irradiation (9), and arterial chemoembolization, which is indicated in patients with unresectable hepatoblastoma, and those who are not candidates for liver transplantation (22,23).

The prognosis of children with hepatoblastoma has improved considerably in recent years through the efforts of all cooperative study groups (12).

In our series of 11 high-risk patients, complete remission was achieved in achieved in 7 patients, relapse in 3 (2 of whom died). In 1 case the tumor was inoperable, and the patient subsequently died after palliative treatment ; and among the 5 standard-risk patients, complete remission was achieved in 3 evaluable patients, a relapse in 1, and 1 died due to uncontrolled hemorrhagic shock.

V. Conclusion :

works realized over the last ten years about hepatoblastoma have led to improved classification, description of histoprognostic factors and the identification of signalling pathways that may offer hope for the emergence of new therapies. The prognosis is satisfactory, with an overall survival rate of almost 80%, even in the high-risk group.

Figures :

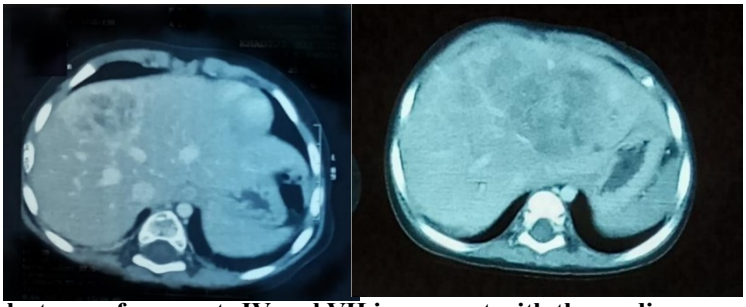

Fig 1 : hepatoblastoma of segments IV and VII in rapport with the median suprahepatic veins.
Fig 2 : hepatoblastoma segments IV-V-VI-VI and VIII

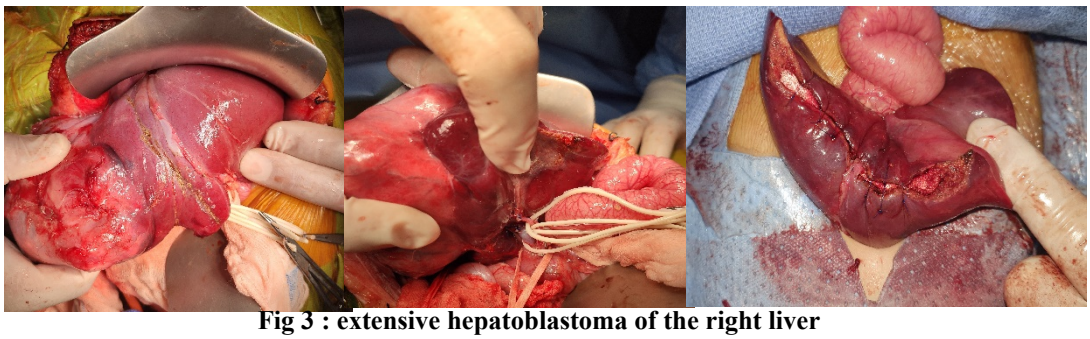

Fig 3 : extensive hepatoblastoma of the right liver
Fig 4 : lacing of the various pedicle elements
Fig 5 : hémostase assurée par surgicel et suture des berges

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