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CONGENITAL - INFANTILE FIBROSARCOMA; EVALUATION OF CLINICAL BAHAVIOUR AND OUTCOME

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Congenital - infantile fibrosarcoma is a relatively rare spindle cell tumour of the soft tissues occurring in children younger than two years of age. Most cases of this tumour involve the extremities or shoulder region and are often misdiagnosed as vascular malformations. For evaluation of clinical behaviour and outcome of congenital–infantile fibrosarcoma, 13 newborns and infants having this tumour have been treated surgically, either alone or combined with chemotherapy and or radiotherapy. Patients were followed up for a period up to 8.5 years. In the present series, wide surgical excision of congenital - infantile fibrosarcoma with pathologically proven safety margin was successful in 10 patients with no recurrence (77%). Preoperative chemotherapy was of benefit in cases of extended tumour size with possible neurovascular invasion so as to avoid heroic amputation surgery. Postoperative chemotherapy and radiotherapy were adjuvant tools in incompletely resected or irresectable tumours. So, wide surgical excision of congenital - infantile fibrosarcoma with pathologically proven safety margin is the treatment of choice. In addition the prognosis of this tumour is much more favourable than the adulthood type.

***Key word:Congenital infantile fibrosarcoma*.**

INTRODUCTION

Congenital-infantile fibrosarcoma is a relatively rare spindle cell tumour of the soft tissues that occurs almost exclusively in children younger than two years of age and is often described in newborns [1,2,3]. There is no sex predilection. Most cases of this tumour involve the extremities or shoulder regions and many are quite large by the time of diagnosis. This tumour may present very early in life and is often misdiagnosed as vascular malformations [4,5,6,7]. For preoperative diagnosis, magnetic resonance imaging (MRI) is considered the modality of choice for evaluation of the disease in the extremities, head, neck and pelvis [8,9]. A properly planned incisional biopsy or radiology guided needle biopsy is the definitive diagnostic aid that although it is technically simple, it is a complex cognitive skill requiring an experienced pediatric surgeon [10,11,12]. The pathological distinction between congenital - infantile fibrosarcoma and other similar lesions as fibrous hamartoma of infancy, embryonal rhabdomyosarcoma, spindle cell angiosarcoma and primitive neuroetodermal tumours in addition to certain benign spindle cell proliferation such as fibromatosis and myofibromatosis sometimes requires immunohistochemical or ultrastrctural studies in addition to routine light microscopy [13,14,15,16]. Because of the different behaviour of congenital - infantile fibrosarcoma, it must be considered a separate intity from the identical lesions occurring in adults. In addition, recent studies showed that almost all cases of congenital - infantile fibrosarcoma exhibited some types of chromosomal gain. Most had trisomies of chromosome 8, 11, 17 and or 20 with diploid or triploid DNA index on fluorescence in situ hybridization analysis [2,13,17]. Some authors have suggested that congenital - infantile fibrosarcoma is more benign than similar lesions occurring in adults [1,6]. Other investigators have pointed out that it can be very aggressive and that the retroperioneal variety had a very low survival rate of about 17% [10,18]. So, the aim of the present study is to evaluate the clinical behaviour and outcome of congenital - infantile fibrosarcoma and to give a suggestion about the prior lines of treatment for such a particular delineated tumour.

PATIENTS AND METHODS

The present study included 13 newborns and infants having congenital - infantile fibrosarcoma which were admitted at Pediatric Surgery Unit and Pediatric Hematology Oncology Unit, Mansoura Faculty of Medicine during the period between 1994 to 2002. Their ages ranged from 2 days to 24 months with a mean 9.3 ± 8.8 months. They included 7 males and 6 females. The tumour was affecting the lower limb, groin and buttocks in 6 patients. The upper limb and shoulder region were affected in 4 patients while it was affecting the trunk in 1 patient. Head and neck affection occurred in one case and retroperitoneal affection occurred also in one case (Table 1). The size of the tumors varies between 3-20cm-length × 2.5–10cm width. Positive family history was present in only one patient while positive consanguinity (2nd degree) was present in two patients. Three patients had different congenital anomalies including Down's syndrome with VSD, complete cleft palate and absence of the left kidney. All patients were subjected to complete general and local examination in addition to complete laboratory and radiological investigations. The radiological investigations included ultrasonography, computed tomography and or magnetic resonance imaging in addition to coloured Doppler ultrasonography in tumours affecting the extremities. They included also plain X ray chest and bone survey for any possible metastases. Tissue diagnosis was established either by exisional biopsy, a properly planned incisional biopsy (taking into consideration obviating the risk of local implantation thus facilitating the need for wide local surgical excision) or by radiology guided needle biopsy. For pathological identification and differentiation of congenital - infantile fibrosarcoma different immunohistochemical stains have been used in addition to the ordinary stains including vimentin, desmin, actin, cytokeratin in addition to vascular endothelial factor (CD 34). Tumour cells ranged from malignant appearing small to large spindle-shaped cells with frequent pleomorphic features and were often arranged in fascicles. They were vimentin positive, desmin, cytokeratin and CD34 negative with occasional focal sensitivity for the smooth muscle actin (Figs. 1 & 2). After establishing a full diagnosis patients have been subjected to surgical extirpation of the tumour that may be preceeded or followed by chemotherapy in the form of VAC (Vincristin, Acinomycin-D and Cytoxan) or VADC (Vincristin Adriamycin and Cytoxan) for different courses. Surgical excision may be also followed by radiotherapy in the form of 50 Gy. Patients were followed up for a period ranging from 10 months to 8.5 years with a mean 2.9 ± 2.4 years for any local recurrence or distant metastases.

RESULTS

Wide surgical excision with pathologically proven safety margin (guided by intraoperative frozen section biopsy) has been performed in 10 cases among them exisional biopsy has been performed first for one case then wide surgical excision has been performed. Palliative resection with debulking has been performed in the retroperitoneal sarcoma due to extensive invasion of the abdominal great vessels. Resection without free safety margin and subsequently with possible residual tumour remnant has been performed in 2 cases, the first one was with fibrosarcoma of the left shoulder and the second one was the case of popliteal fossa tumour because of invasion of the main vessels and joint capsule. The reconstructive procedures varied between primary closure, primary Theirsh grafting, lay opened with delayed grafting and rotational pedicled flap (Table 2 & Figs. 3- 8).

Preoperative chemotherapy only has been administered in 3 cases with huge tumour size and possible invasion of the neurovascular bundle proven by MRI. Postoperative chemotherapy and radiotherapy have been administered in two cases with simple excision without free safety margin and subsequently with possible residual tumour remnant. Preoperative chemotherapy in addition to postoperative chemo and radiotherapy have been administered for only one case with retroperitoneal fibrosarcoma with invasion of the abdominal great vessels.

The follow up period revealed 10 patients with complete cure with no evidence of recurrence (77%). Mortality occurred 1.5 years postoperatively in the case of retroperitoneal sarcoma due to pulmonary metastases (7.7%). Recurrence occurred in two cases (15.3%). It occured 10 months postoperatively in the case of fibrosarcoma in the popliteal fossa and was in need for above knee amputation. The second case recurred 1 year postoperatively with fibrosarcoma of the left posterolateral leg for which extensive wide re-excision has been performed with reconstruction by delayed Theirsh grafting. The patient developed dropped foot due to posterior tibial nerve affection.

(Table 1): ***Patients descriptive data.***

No.	*Age (Months)*	*Sex*	*Tumour site*	*T. size (radiology)*	*F.H*	*Consanguinity*	*Congenital anomalies*
1	6	♀	Lt lateral thigh	9×5	-ve	+ve	Down's syndrome, VSD
2	12	♂	Rt buttock	20×10	-ve	-ve	-
3	1	♂	Lt ant arm	16×6	-ve	-ve	-
4	2/30	♂	Face	10×6	-ve	+ve	-
5	8	♀	Rt shoulder	10×7	-ve	-ve	-
6	25/30	♂	Lt ant. fore arm	9×7	-ve	-ve	-
7	23	♀	Lt post lat leg	10×8	-ve	-ve	-
8	4	♀	Lt groin	6×5	-ve	-ve	Complete cleft palate
9	2	♂	Rt ant hand	3×2.5	+ve	-ve	-
10	13	♂	Rt post thigh	10×8	-ve	-ve	Agenesis left kidney
11	5	♀	Ant trunk	12×6	-ve	-ve	-
12	22	♂	Retroperitoneum	12×10	-ve	-ve	-
13	24	♀	Lt popliteal fossa	6×6	-ve	-ve	-

Table (2): ***Treatment policy and follow up results.***

No.	*Operative procedures*	*Chemotherapy*		*Postoperative radiotherapy*	*Follow up data*	*Follow up period*
		Preop.	*Postop.*			
1	Wide excision + primary grafting	-	-	-	ANED	1 year then lost follow up
2	Wide excision + primary rotational flap	+	-	-	ANED	8.5 years
3	Wide excision + primary grafting	+	-	-	ANED	7 years
4	Wide excision + primary closure	-	-	-	ANED	4.5 years
5	Resection & lay opened + delayed grafting	-	+	+	ANED	3 years
6	Wide excision + primary closure	-	-	-	ANED	2 years then lost follow up
7	Wide excision + delayed grafting	+	-	-	Recurrence after 1 year	1 year
8	Wide excision + primary rotational flap	-	-	-	ANED	2.5 years
9	Exisional biopsy + Wide excision + primary closure	-	-	-	ANED	2.5 years
10	Wide excision + delayed grafting	-	-	-	ANED	2 years
11	Wide excision + rotational flap	-	-	-	ANED	1.5 years
12	Debulking	+	+	+	Death after 1.5 years	1.5 years
13	Resection & lay opened + delayed grafting	-	+	+	Recurrence after 10 months	10 months

ANED: Alive No Evidence of Disease.

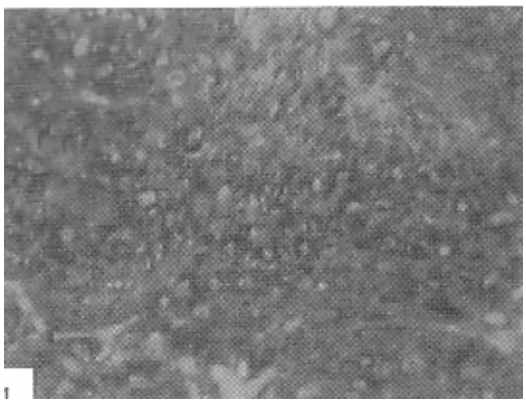

Fig.(1): Congenital-infantile fibrosarcoma: diffuse positive with vimentin stain (peroxidase X400).

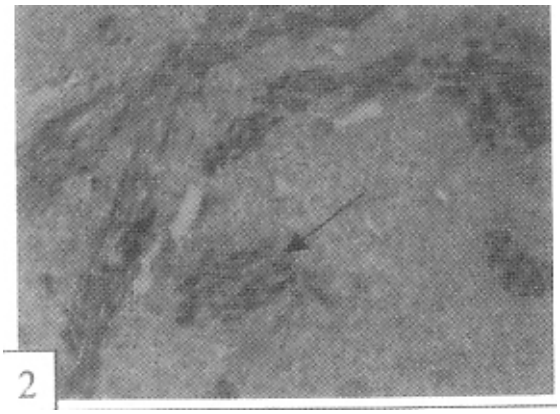

Fig .(2): Congenital-infantile fibrosarcoma: focal positive with smooth muscle actin stain (peroxidase X100).

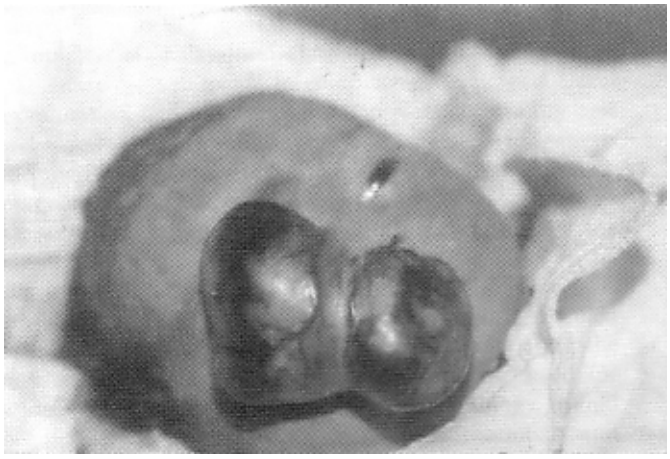

Fig.(3): An infant 2 days age with fibrosarcoma of the face extending to the right nostril and nasal septum.

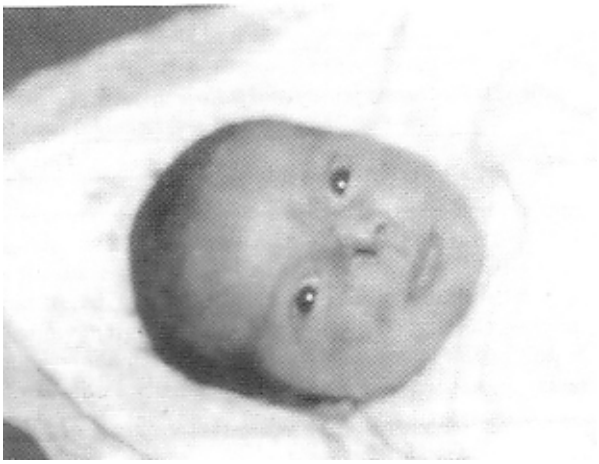

Fig.(4): The same infant 2 months after wide surgical excision.

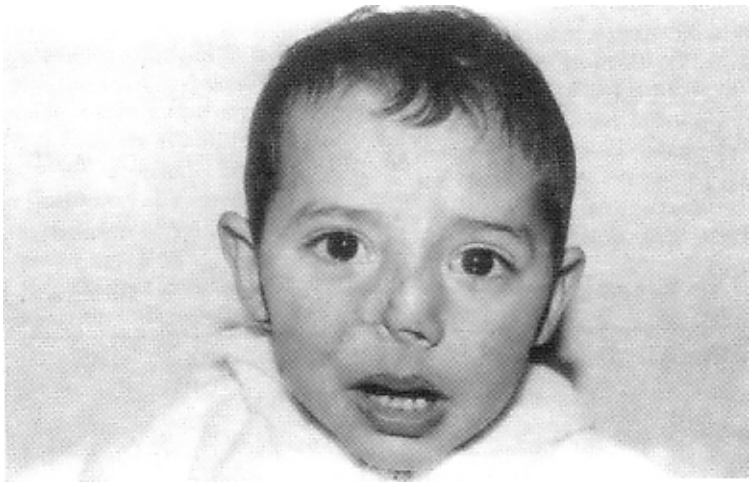

Fig. (5): The same patient at 2 ½ years age.

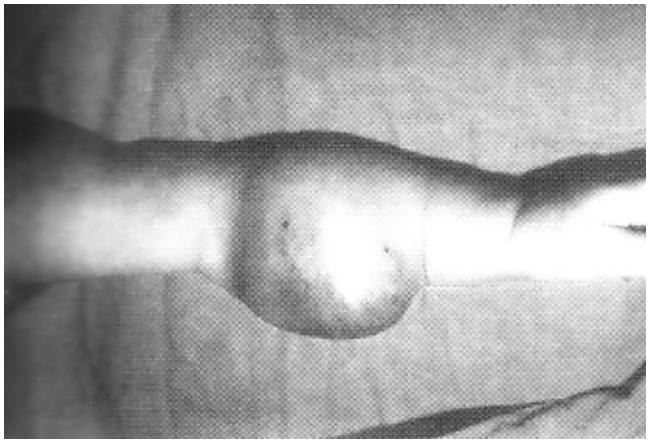

Fig. (6) : An infant approximately 1-month age with fibrosarcoma of the left anterior forearm.

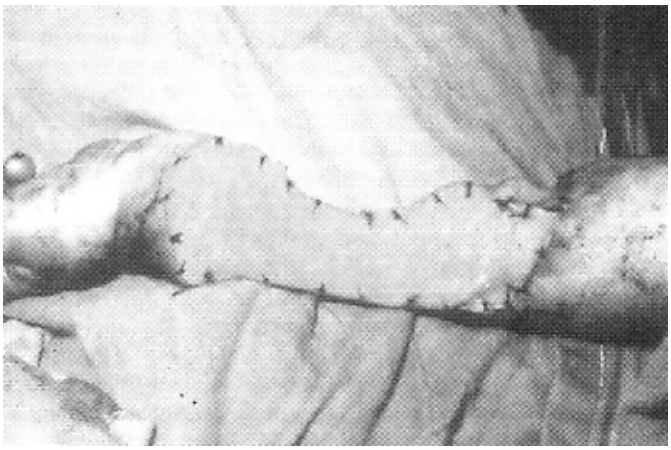

Fig. (7): Wide surgical excision and primary Theirsh grafting have been performed.

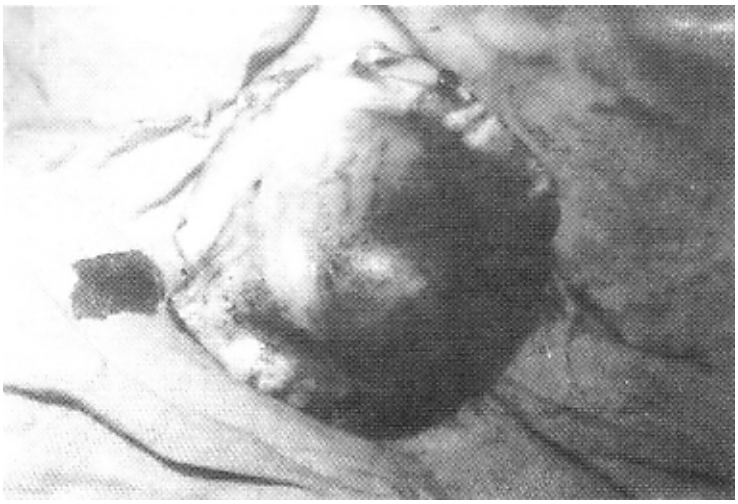

Fig. (8): The excised specimen.

DISCUSSION

Fibrosarcoma is primarily an adult malignancy because more than 80% of patients are over 20 years of age at the time of diagnosis. Congenital - infantile fibrosarcoma describes a tumour that appears histologically similar to the adult type but occurs almost exclusively in the first two years of life. Approximately one third of these lesions is present at or early after birth [6,18,19]. So, the present study was planned out to give an idea about the different behaviour and outcome of congenital - infantile fibrosarcoma and to give a suggestion about the prior lines of treatment for this tumour. For this purpose 13 newborns and infants have been treated surgically with adjuvant chemotherapy and radiotherapy in some cases and followed up for a period up to 8.5 years for evidence of recurrence. In the present series wide surgical excision of congenital - infantile fibrosarcoma was successful in 10 patients without any evidence of local recurrence (77% success rate). This means that wide surgical excision is a very effective treatment of such tumour. The results of the present study come in agreement with the results of some investigators [10,11], which stated that the efficacy of compartmental resection of congenital – infantile fibrosarcoma over wide excision in achieving local tumour control has not been demonstrated.

Tumour recurrence in the present series occurred in 2 cases only (15.3%) and this rate was relatively lower than what is recorded by certain investigators [10], which recorded a recurrence rate of 20% - 43%, and the recurrence may occur as late as 15 to 31 years. So, the relatively lower recurrence rate may be due to a shorter follow up period. However, no evidence of distant metastases was present in both recurrent cases. One of the recurrent cases was in need for above knee amputation and the other case was treated by wide surgical re-excision. Interestingly enough the 2 recurrent cases were relatively older in the present series (24 months and 23 months respectively). This means that the chance of recurrence is much higher with a relatively older age. This agrees with the series of some investigators [10,20,21] which stated that the prognosis of congenital - infantile fibrosarcoma is much better than childhood fibrosarcoma. In addition, the prognosis of congenital - infantile fibrosarcoma is much favourable in the first year of life. So, it is clear enough that the age of presentation is a very critical factor regarding the prognosis of such tumour so that certain inverstigators [21,22,23] described a prenatal ultrasound diagnosis of congenital fibrosarcoma with a radiological criteria reaching a considerable accuracy in their series. The case of mortality was that of aggressive retroperitoneal fibrosarcoma that was irresectable with invasion of the great abdominal vessels. The tumour was chemoresistant and radioresistant and the patient died due to pulmonary metastases. This agrees with the study of other investigators [18] which stated that the retroperitoneal variety of congenital - infantile fibrosarcoma seemed to have a very poor prognosis.

Preoperative chemotherapy has been administered in three cases with huge tumour size and possible invasion of the neurovascular bundle with successful wide surgical excision. Thus, preoperative chemotherapy may avoid heroic amputation surgery in cases with extended congenetal - infantile fibrosarcoma. This agrees with the results of some investigators [12,16].

Postoperative chemotherapy and radiotherapy have been administered in only 2 cases with possible tumour remnant one of these tumours recurred after 1 year while no recurrence occurred in the case of fibrosarcoma of the left shoulder meaning that spontaneous regression of incompletely resected congenital - infantile fibrosarcoma may occur. This has been documented in some cases by other investigators [24]. The biological explanation of such phenomenon may be due to a lower proliferative index coupled with enhanced apoptosis compared to adult fibrosarcoma. Thus in conclusion it is evident that congenital - infantile fibrosarcoma is a rare soft tissue neoplasm that although it is histologically similar to fibrosarcomas occurring in adults, it differs greatly in its clinical behaviour. Metastases are rare However, local recurrence is common. The prognosis is favourable much more than the childhood or adult varieties. Wide surgical excision with pathologically proven safety margin is the treatment of choice that should be performed as early as possible. Moreover, re-excision of recurrent tumours must be the prior treatment more than limb amputation. Preoperative chemotherapy is of benefit in cases of extended tumours with possible neurovascular invasion. Postoperative chemotherapy and radiotherapy are adjuvant tools in incompletely resected or irresectable tumours.

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