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International Journal of Current Research
Vol. 7, Issue, 07, pp.18542-18544, July, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

SURGICAL TREATMENT OF BOTH-BONES DIAPHYSEAL FOREARM FRACTURES IN CHILDREN

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ARTICLE INFO

Article History:
Received 01st April, 2015
Received in revised form
23rd May, 2015
Accepted 29th June, 2015
Published online 31st July, 2015

Key words:

Children,
Forearm,
Fractures,
Surgery.

ABSTRACT

Introduction: The treatment of children fractures of the forearm two bones aims to restore pronation-suppination. It is orthopedic in most cases but surgery has some indications. The aim of the study was to describe the surgical treatment modalities and to evaluate their effectiveness. **Methods:** A retrospective longitudinal study was carried out between January 1995 and July 2011 on 78 hospitalized patients in the Pediatric Orthopedic surgery department of Ibn Rochd university hospital.

Results: The average age of patients was 9.2 years (SD = 3.1) with a male predominance. The left side was the most affected. Surgical treatment was decided after failure of conservative treatment, constituting 40.6% of the therapeutic processes. Sixty-eight children (87.2%) had a FIN (Flexible intramedullary nailing), one child was treated with a bone plate. The hospital stay averaged 3.5 days (SD = 2). The consolidation period was 11.5 weeks (SD = 2.1) and 57.1% of patients underwent a removal under general anesthesia after 12 months (SD = 6). The result was excellent or good in 47 cases (92.1%) and poor in 4 cases handled by FIN, otherwise excellent in the case of the bone plate.

Discussion and Conclusion: Surgery allows the fixation of fractures that are inaccessible to orthopedic treatment especially in older children. The FIN is a simple technique with satisfactory postoperative course and good functional results.

Citation: El Kettani, A., Arihi, M., Bjitro, C., Aboumaarouf, M., Yousri, B. and El Andaloussi, M. 2015. "Surgical treatment of both-bones diaphyseal forearm fractures in children", *International Journal of Current Research*, 7, (7), 18542-18544.

INTRODUCTION

Both-bones diaphyseal forearm fractures are defined by bone continuity solution a 2 cm below the bicipital tuberosity and 4 cm above the radiocarpal articulation (Quesnot *et al*., 2008). They are frequent (3.4% of all fractures in children) (Kalenderer *et al*., 2006) and compromise the functional prognosis by affecting the member supination and pronation. Although they are sucessfully orthopedically treated (in most cases) because of children remodeling capacity, surgical treatment has specific indications (Pouliquen *et al*., 2002). Objective: To describe surgical treatment procedures of diaphyseal fractures of both forearm bones in children and to evaluate their effectiveness.

MATERIALS AND METHODS

This is a retrospective longitudinal study, conducted between January 1995 and July 2011, involving 78 children admitted to the pediatric orthopedics department of Abderrahim Harouchi hospital (Ibn Rochd university hospital – Casablanca), in who msurgical treatment was instituted for fracture of one or both bones of the forearm. Data were collected from medical records. We have used Jones criteria, based on pain, function, consolidation and limb mobility,to evaluate the different types of treatment.

RESULTS

The average age of patients was 9.2 (SD = 3.1) years with a male predominance in 83.6%. The left side was the most affected (63.8%). Surgical treatment was done after failure of orthopedic treatment (instability and irreducibility of the fracture, iterative fracture, secondary displacement, nonunion) and represented 40.6% of therapeutic methods. A total of 68 children (87.2%) underwenta FIN (Flexible intramedullary nailing) including 33 with open reduction, a child was treated by a screw plate, a child had an open reduction and rigging after failure of FIN (narrow spinal canal), five children had an osteoclasis, reduction and cast immobilization and 3 were amputated due to a Volkmann syndrome with gangrene (application of "Jbira") (Fig.1).

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The average duration of hospital stay was 3.5 ± 2 days and the consolidation period 11.5 ± 2.1 weeks. Material ablation was performed under general anesthesia in 57.1% of cases after 12 ± 6 months.

According to Jones criteria, results were excellent or good in 47 cases (92.1%) and poor in 4 cases treated by FIN: 3 cases of nonunion and one case of synostosis, But excellent in the case of the screw-plate (Table 1)

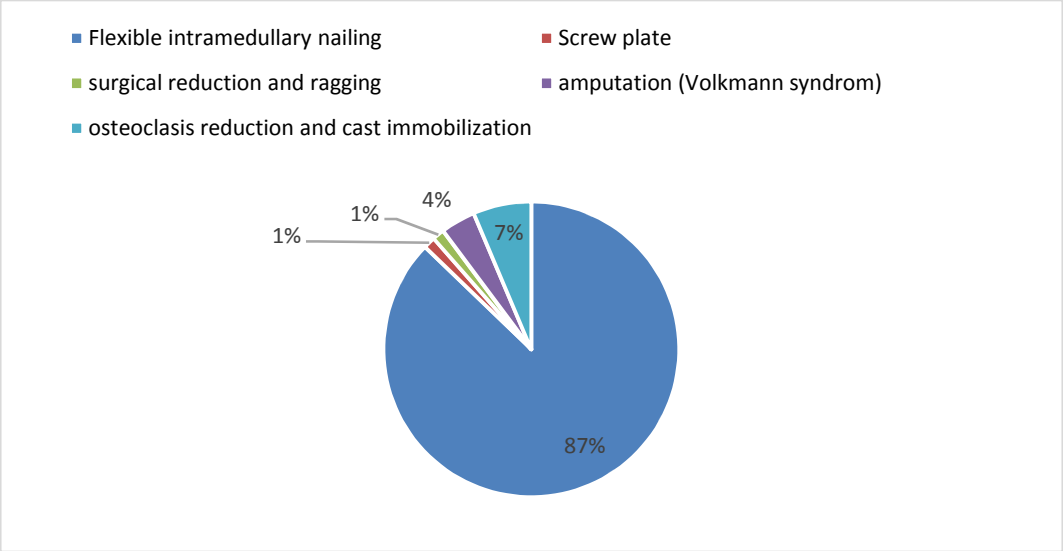

Fig. 1. Distribution of surgical treatment procedures in our study

Table l. Results of different types of surgical treatment (amputations excluded) according to Jones criteria

Types of surgical treatment	Excellent results	Good results	Average results	Poor results	Patients lost to follow up
FIN N : 68	45	2	0	4	17
SP N= 1	1	–	–	–	–
Surgical reduction and rigging N= 1	–	–	–	–	1
Osteoclasis, reduction and immobilization N= 5	4	0	0	0	1
Total N= 75	50	2	0	4	19

FIN : Flexible Intramedullary Nailing; SP : Screw Plate

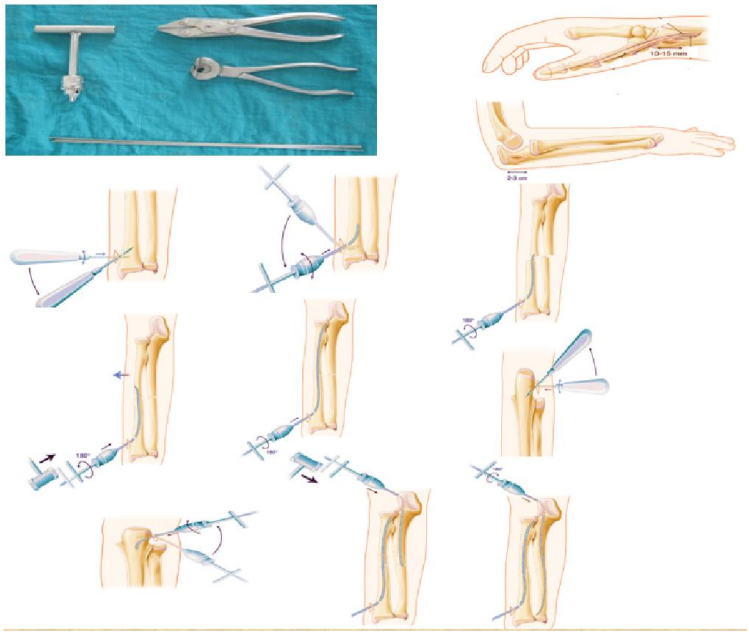

Fig.2. Flexible intramedullary nailing technique

Of the 78 patients included in our study, 87.2% were treated with FIN after failure of closed reduction. The postoperative course was satisfactory and results were excellent or good in the majority of cases (92.1%).

Surgical treatment allows the fixation of fractures that are inaccessible to the orthopedic treatment in older children (with less remodeling capacity). The FIN using KIRSCHNER nails according to METAIZEAU technique is a simple closed technique (Fig. 2). It allows the respect of the fracture hematoma and periosteum and has good postoperative course. The cast immobilization is required after surgery and removal of the material could be done in the 6th month (Lascomb, 2007; Lascomb *et al*., 2006).

PREVOT (Prévot *et al*., 1995) recommends to screw displaced fractures in children over the age of 10 years and children under 10 years in whom conservative treatment has failed. YUNG (Yung *et al*., 1998) added displaced fractures of one or both bones with angulation more than 10 ° regardless of the age. By adopting the conclusions of KARGER (Karger *et al*., 1986), LE FEVRE (Le Fèvre, 1988) proposes to systematically fix fractures in children over than 12 years in whom the slightest malunion will not be improved by growth; The secure attitude would be to fix diaphyseal fractures with angulation over than 10 ° in children over 8 years after failure of conservative treatment (Barsaoui *et al*., 2009).

The main difficulty of FIN is the injury of neurovascular and tendon elements and to increase the edema in muscle lodges with reduction attempts and nailing. Hence, a mini incision next to the fracture site is indicated rather than multiple attempts of reduction by external maneuvers with several scopic controls (Yalcinkaya *et al*., 2010)

Our results confirm those of previous studies, including the study of ÖZKAYA (Ozkaya *et al*., 2008), conducted among 35 children treated by FIN where results were good or excellent in 100%, the study of YALCINKAYA (Yalcinkaya *et al*., 2010) where results of FIN were excellent or good in 77.8% of cases and the study of BASRAOUI (Barsaoui *et al*., 2009) where they were excellent or good in 88.1% of cases (according to the Price criteria).

The Indications of screw plate are rare in children (fractures of the distal third radius) due to the significant periosteal it requires and the risk of infection. The external fixator is indicated whena sagging skin is associated (Ozkaya *et al*., 2008). (No patient has benefited of it in our study).

Conclusion

Surgical treatment of diaphyseal both bones forearm fractures in children has specific indications. The FIN is a simple technique with satisfactory postoperative course and good functional results.

But we should neither succumb to the ease of a systematic first of the fracture site nor multiply reduction attempts. Hence the importance to study the predictive factors of reduction failure permitting to decide of a surgical first of the fracture.

REFERENCES

Barsaoui M, Ouadhour A, Ben Slimane N, Sghairi K, Smida M, Ben Ghachem M. Indications et complications de l'embrochage centro-médullaire dans les fractures diaphysaires des deux os de l'avant-bras chez l'enfant. *Tunisie orthopédique,* 2009; 2 (2) : 183-187.

Kalenderer O, Gurcu T, Reisoğlu A, Ağuş H. The frequency and distribution of fractures in children presenting to the emergency service. *Acta Orthop Taumatol Turc.,* 2006;40:384-7

Karger C, Dietz J M, Keckel T, De Thomasson E, Briot B. Devenir des cals vicieux diaphysaires de l'avant-bras de l'enfant. A propos de 108 fractures traitées par méthode orthopédique. *Rev Chir Orthop*., 1986; 72(Suppl 2):44-7.

Lascomb P, Haumont T, Journeau P. L'embrochage d'une fracture des 2 os de l'avant-bras chez l'enfant et l'adolescent. *Rev Chir Orthop*, 2006; 92: 615-622.

Lascomb P. Embrochage centromédullaire élastique stable. EMC, Techniques chirurgicales; *Orthopédie-traumatologie*, 44018, 2007.

Le Fèvre G. Intérêt de l'embrochage chez l'enfant par embrochage centroméd ullaireélastique stable. Sauramps Médical, Montpellier, 1988.

Ozkaya U, Parmaksizoglu A S, Kabukcuoglu Y, Yeniocak S, Sökücü S. Surgical management of unstable both-bone forearm fractures in children. *Acta Orthop Traumatol Turc.,* 2008 ; 42(3) :188-192.

Pouliquen J C, Langlais J, Glorion C. Généralités sur les fractures de l'enfant. *EMC appareil locomoteur* [14-031-B-10] 2002.

Prévot J, Lascombes P, Guichet J M. Elastic stable intra-medullary nailingof forearm fractures in children and adolescent. *Orthop Trans*., 1995; 20:305.

Quesnot A, Chanussot J C, Danowski R G. Fractures diaphysaires des deux os de l'avant-bras. Rééducation de l'appareil locomoteur, Tome 2, *Membre supérieur* 2008 : 239-255.

Yalcinkaya M, Dogan A, Ozkaya U, Sökücü S, Uzümcügil O, Kabukçuoğlu Y. Clinical results of intramedullary nailing following closed or mini open reduction in pediatric unstable diaphyseal forearm fractures. *Acta Orthop Traumatol Turc*.,2010 ; 44(1): 7-13.

Yung S H, Lam C Y, Choi K Y, Ng K W, Maffulli N, Cheng J C. Percutaneous intramedullary Kirschner wiring for displaced diaphyseal forearmfractures in children. *J Bone Joint Surg.,* 1998; 80:91-4.

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