

Supracondylar Fractures Of The Humerus In Children At The Pediatric Surgery Service Of Albert Royer National Children's Hospital

P MBAYE, M FALL, C SEYE, T LOMANDET, D GUEYE, S CAMARA, N SECK, I WELLÉ, F ZENG, N NDOYE, A SAGNA, O NDOUR, G NGOM

Citation

P MBAYE, M FALL, C SEYE, T LOMANDET, D GUEYE, S CAMARA, N SECK, I WELLÉ, F ZENG, N NDOYE, A SAGNA, O NDOUR, G NGOM. *Supracondylar Fractures Of The Humerus In Children At The Pediatric Surgery Service Of Albert Royer National Children's Hospital*. The Internet Journal of Orthopedic Surgery. 2022 Volume 30 Number 1.

DOI: [10.5580/IJOS.56287](https://doi.org/10.5580/IJOS.56287)

Abstract

Supra condylar fractures of the humerus (SCF) in children are the most common elbow fractures. The objective of this work was to study the epidemiological, lesional, therapeutic and evolutionary aspects of the SCF in children at the pediatric surgery department of Albert Royer Children's Hospital from January 1, 2016 to December 31, 2017. This is a retrospective descriptive study of 133 patient records. The overall analysis of the results inferred that: Supracondylar fractures of the elbow in children predominated between 5 and 10 years with extremes of 2 to 15 years and an average age of 6.47 years. Boys were the most affected with a sex ratio of 2.02; The circumstances of occurrence were dominated by accidents in everyday life (89%); The extension fracture is largely the most frequent at 96%; grade II fractures were the most common, accounting for 63.91% of cases; Treatment was mainly orthopedic in 88% and surgical in 12%; The results were satisfactory in 94 patients among the 103 patients reviewed and poor in 9 children.

INTRODUCTION

Supracondylar fractures of the humerus (SCF) in children represent the most common (55-75%) of elbow fractures [1]–[4]. They mainly occur during everyday accidents [1], [5], more often after a fall on the hand with the elbow extended [1]–[3]. Children aged 5 to 10 are the most affected [6]–[8]. Clinical examination and standard X-ray can be used to diagnose and classify these fractures [9]. French literature refers to the Rigault and Lagrange classification while the Anglo-Saxons use the Gartland classification [10], [11]. The treatment of SCF in children is currently well codified, it can be orthopedic or surgical [7], [9].

The results of the treatment are often satisfactory but complications and sequels can occur such as ulna varus or valgus, stiffness of the elbow, superinfection of the operative wound and vasculo-nervous disorders [1].

In Senegal, various studies have been carried out on supracondylar fractures of the elbow, mainly on the therapeutic aspect [12], [13]. This time we report the study

carried out children in the pediatric surgery department of Albert Royer Children's Hospital in Dakar on the epidemiological, diagnostic, therapeutic and evolutionary aspects of these fractures within the said pediatric surgery department.

METHODOLOGY

This is a retrospective descriptive cross-sectional study carried out in the pediatric surgery department of the CNHEAR in Dakar. The patients included in the study were aged 0 to 15 years, received at the pediatric surgery department of Albert Royer for a recent supracondylar fracture (fracture occurring within 21 days) between the period from January 1, 2016 to December 31 2017. All fracture stages from the Rigault and Lagrange classification have been included. We retained 133 cases meeting our selection criteria. Unworkable records as well as supracondylar elbow fractures older than 21 days were not included in the study. These cases were 7 in number, 5 of which were due to lack of data and 2 related to insufficient follow-up. The parameters studied were age, sex,

mechanism, consultation time, circumstances of occurrence, anatomopathological type according to the Rigault and Lagrange classification, immediate complications, associated lesions, therapeutic methods, morphological and functional results. Functional results were assessed using the Mayo Clinic Elbow Score, which remains one of the benchmarks in terms of elbow assessment.

RESULTS

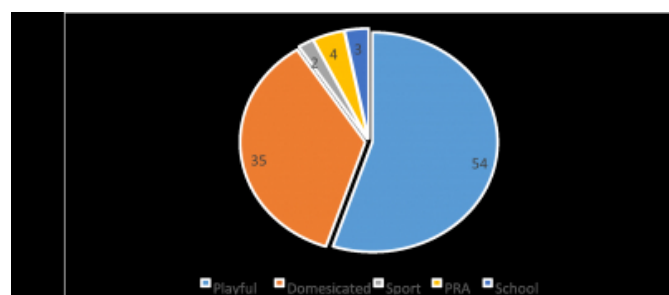
The mean age of the patients was 6.5 years with ranges between 2 and 15 years and a standard deviation of 2.5 years. The 5 to 10 age group was the most represented with 65.2%. Patients 0 to 5 years old accounted for 23.5% while the rest were between 10 and 15 years old. The series included 89 boys (67%) and 44 girls (33%) for a sex ratio of 2.02.

The time to consultation was on average 7.7 hours with a standard deviation of 23.6 hours and extremes of 3 hours and 10 days. One hundred and twenty-eight patients (89%) were seen in hospital on the day of their trauma. The others were admitted within 10 days of the trauma at most.

The circumstances of occurrence were dominated by playful accidents (Figure 30). The mechanism was clarified in 113 patients. It was direct in 5 cases (4%) and indirect in 108 cases (96%).

Figure 1

Distribution of patients according to the circumstances of occurrence



Stage II supracondylar fractures according to the Rigault and Lagrange classification were the most frequent representing 63.91% of patients followed by stage III fractures with 21.5% and stage I and IV fractures with an identical proportion. Two patients (1.5%) presented with dermabrasion-like skin lesions.

Table1

Symptomatic treatment

Symptomatic treatment	Frequency	Percentage
ABAP+ANGS+NSAID	4	3,01
NSAID	2	1,5
ANGS	9	6,77
ANGS+NSAID	67	50,38
ANGS+NSAID +ATB	1	0,75
Member suspension +ANGS+NSAID+ATB	1	0,75
Member suspension + NSAID	2	1,5
Member suspension + ANGS	5	3,76
Member suspension + ANGS + NSAID	42	31,58
TOTAL	133	100

One hundred and seventeen patients (88%) received orthopedic treatment.

Among them 16 had a BABP splint and 101 benefited from the Blount method. Sixteen children were operated on, ten of which were pinned in X by posterior approach and 6 by pinning according to Judet.

Of the 133 in our 103 series have been overhauled up to 3 years. By evaluating the overall functional scores by the Mayo Clinic Elbow Score we had the following results 13.6% of excellent results (14 cases), 46.6% of good results (48 cases) and 31.06% of average results (32 cases). In addition, one patient presented with ulna varus without notification of angulation

DISCUSSION

The predominance of FSCs of the elbow found between 5 and 10 years in our study and many series is justified by two anatomical characteristics of the child's elbow at this age, namely ligament laxity which promotes hyper-extension at the level of the olecranon dimple, the fracture occurs by ram effect of the olecranon but also the fragility of the olecranon region at this age due to the significant remodelling that it undergoes under the effect of growth [7], [9], [14], [15]. Other factors can be reported such as turbulence in children at this age as well as clumsiness.

In our series 2/3 of the patients are male. This male predominance almost in all the other studies could be explained by the strong turbulence of boys, especially at school age, with the discovery of play and sports activities [9], [16], [17].

In the majority of cases, patients with FSC consult the

department early. In general, the time to admission is early, identical to our result [7], [18]. We note, however, that 10% of patients consult late.

The majority of children are admitted in the event of a play accident or a domestic accident; therefore accidents of everyday life [5], [9], [14].

The mechanism of falling on the palm of the hand with the elbow in hyper-extension remains the most frequent in the occurrence of SCF because the child who falls tries to protect himself by falling on the upper limb in hyper-extension, a situation in which the humeral pallet is more vulnerable [9], [14].

Type II supracondylar fractures are the most common in our series. This would be related to the circumstances of the occurrence of the trauma responsible for these fractures. In fact, domestic and gaming accidents are low velocity traumas which certainly explain the rarity of long journeys. In the other series, type IV fractures are more frequent [9], [14], [16].

Only 1.5% of our patients presented mainly dermabrasions in association with the fracture. Skin lesions rank first among the rare associated lesions, ahead of vascular and nerve damage [7], [9], [14], [17], [19]. In recent FSC, symptomatic treatment is still required. Its purpose is to calm the pain and reduce the oedema. Symptomatic treatment can use analgesics and anti-inflammatory drugs, but also a suspension to reduce the oedema. This resorption of oedema is conducive to performing the Blount method, which is the most widely used therapeutic procedure in our work. [19].

The majority of patients are treated by the Blount method in our study [19].

All patients with type II to IV can benefit from this method as long as the posterior periosteum is not ruptured. The selection of patients must therefore be carried out under general anesthesia in the operating room by testing the stability of the reduction. It is only when Blount's method fails or the elbow is unstable that a surgical decision is made. This surgery is carried out by pinning with closed hearth according to Judet or with open hearth in our study. It must be recognized, however, that surgery is rarely performed in the department because of the good reduction obtained by the Blount method, notably thanks to the image intensifier [19]. In the study of Diarra in Mali, on the other hand;

surgery takes precedence over orthopedic treatment because its department does not have an image intensifier [7], [9].

The treatment of childhood SCF is resolutely orthopedic on the condition of having an image intensifier [7], [9], [20].

The course of treatment for SCF of the elbow is often favorable.

Thus, in our work, children who have benefited from treatment using the Blount method do not present any vasculo-nervous complications.

Our good results according to Mayo Clinic Elbow Score constitute a little more than 60% of the cases which proves that the results are generally satisfactory.... However, it should be noted that the frequency of average results is quite high, with around a third of cases. Prolonged follow-up is necessary to determine results as some are likely to improve.

CONCLUSION

Childhood FSC Elbow at Albert Royer Children's Hospital is treated by the Blount method and has shown good results.

References

- [1] and B. C. C. J. C. F. Fernandes, T. V. Milan, H. A. M. F. Ribeiro, H. E. Stein, H. C. Ribas, "DISTAL HUMERAL FRACTURE: AN EPIDEMIOLOGICAL ANALYSIS OF ORTHOPEDIC PATIENTS FOR CHILDREN," *Acta Ortop. Bras.*, vol. 27, no. 5, pp. 261–264, 2019.
- [2] J. C. F. F. et Al., "Elbow fractures in children and adolescents," *Acta Ortop. Bras.*, vol. 52, no. 5, pp. 661–665, 2003.
- [3] H. D. B. and T. Van Isacker, "Fractures de l'extrémité inférieure de l'humérus chez l'enfant," *Appar. locomoteur*, vol. 2, no. 1, pp. 1–10.
- [4] and M. J. G. T. F. Sibly, P. J. Briggs, "Supracondylar fractures of the humerus in childhood: range of movement following the posterior approach to open reduction," *Injury*, vol. 22, no. 6, pp. 456–458, 1991.
- [5] M. K. Aniss Chagou, Abdelkarim Rhanim, Rachid Zanati, "Blount technique in the treatment of supra condylar fractures of the elbow in children: report of 68 cases," *Pan Afr Med J.*, vol. 8688, pp. 1–7, 2014.
- [6] and D. A. L. C. E. N. Siegenthaler, D. N. Lutz, U. H. E. L. Chuv, P. D. Pioletti, "Fixation par deux ou trois broches parallèles pontées dans les fractures supracondyliennes chez l'enfant Expert," 2013.
- [7] M. D. Siméon, "ÉTUDE ÉPIDÉMIO-CLINIQUE ET THÉRAPEUTIQUE DES FRACTURES SUPRA CONDYLINIENNES DU COUDE CHEZ L'ENFANT DE 0 A 15 ANS AU CHU GABRIEL TOURÉ," *Thèse Dr. en Médecine*, 2019.
- [8] L. Lahyaoui, "Les fractures supracondyliennes de l'humérus chez l'enfant (à propos de 370 cas)," *Apr.* 2010.
- [9] DIARA, "THÉRAPEUTIQUES DES FRACTURES SUPRA CONDYLINIENNES DE L' HUMERUS CHEZ L' ENFANT," *Thèse Dr. en médecine*, 2015.
- [10] R. P. Lagrange J, "Treatment of supra-condylar fractures of the humerus in children," *Press. Med.*, vol. 2382,

pp. 53–78, 1970.

[11] and L. M. A. Vaquero-Picado, G. González-Morán, “Management of supracondylar fractures of the humerus in children,” *Br. Editor. Soc. Bone Jt. Surg.*, vol. 3, no. 10, pp. 526–540, 2018.

[12] C. V. A. Kinkp, A. V Dansokho, M. M. Niane, E. Chau, J. S. de Gauzy, and J. L. Clement, “Fractures supracondyliennes de l’humérus: utilité de la méthode de Blount,” *Rev. Chir. Orthopédique Traumatol.*, vol. 1700, no. 3, pp. 255–390, 2010.

[13] “pdf.”

[14] A. N., “Les fractures supracondyliennes de l’humérus chez l’enfant à propos de 60 cas au service d’orthopédie traumatologie pédiatrique au CHU de Marrakech,” *Thèse de médecine Maroc*, vol. 82, 2012.

[15] V. K. and A. Singh, “Fracture Supracondylar Humerus: A Review,” *J. Clin. Diagn. Res.*, vol. 10, no. 12, pp. RE01–RE06, 2016.

[16] B. IMANE, “TECHNIQUE DE JUDET DANS LE

TRAITEMENT DES FRACTURES SUPRA CONDYLIIENNES DE L’HUMERUS CHEZ L’ENFANT (A propos de 39 cas),” *Thèse Dr. en Médecine*, 2015.

[17] and P. W.-W. R. Tomaszewski, A. Wozowicz, “Analysis of Early Neurovascular Complications of Pediatric Supracondylar Humerus Fractures: A Long-Term Observation,” *Biomed Res. Int.*, vol. 2017, 2017.

[18] M. E. O. Redouane Hani, Mustapha Nekkaoui, Mohammed Kharmaz, “Surgical treatment of the humeral pallet fractures in adults Redouane,” *panafrican-med-journal*, vol. 8688, pp. 1–7, 2017, doi: 10.11604/pamj.2017.26.79.10781.

[19] A. Chagou et al., “Blount technique in the treatment of supra condylar fractures of the elbow in children: report of 68 cases TT,” *Pan Afr. Med. J.*, vol. 19, p. 52, 2014.

[20] BOUDANA, “Les fractures supracondyliennes de l’enfant à l’Hopital Provincial de Khemisset (A propos de 260 cas),” *These Dr. en Médecine*, 2009.

Author Information

Papa Alassane MBAYE

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Mbaye FALL

Service of Pediatric Surgery, Aristide Le Dantec University Teaching Hospital, Université Cheikh Anta Diop Dakar
Dakar, Senegal

Cheikh SEYE

Anatomy Laboratory, Université Alioune Diop
Bambey, Senegal

Tuspin Deba LOMANDET

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Doudou GUEYE

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Souleymane CAMARA

Service of Pediatric Surgery, Aristide Le Dantec University Teaching Hospital, Université Cheikh Anta Diop Dakar
Dakar, Senegal

Ndeye Fatou SECK

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Ibrahima Bocar WELLÉ

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Florent Tshibwid A ZENG

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Ndeye Aby NDOYE

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Aloïse SAGNA

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

Oumar NDOUR

Service of Pediatric Surgery, Aristide Le Dantec University Teaching Hospital, Université Cheikh Anta Diop Dakar
Dakar, Senegal

Gabriel NGOM

Service of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop
Dakar, Senegal

