Comparative Study of Drug Side Effects between the Child and Adult

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***Abstract*- It has been shown that ADRs are one of the ten causes of death and disease worldwide. Etude statistique comparative entre les adultes et les enfants effectuée par le laboratoire de génétique et biométrie à Kenitra en collaboration avec le centre antipoison et de pharmacovigilance du Maroc (CAPM) pour vérifier si le même problème se présente au Maroc. Comparative statistical study between adults and children conducted by the Laboratory of Genetics and Biometrics at Kenitra in collaboration with the poison control and pharmacovigilance of Morocco (CAPM) to check if the same problem in Morocco. Cette étude a été menée sur 135 patients qui ont eu au moins un EIM en Juin 2009. This study was conducted on 135 patients who had at least one ADR in June 2009. Les classes thérapeutiques incriminées dans la survenue des EIM chez les enfants diffèrent de chez les adultes. The therapeutic classes incriminated in the occurrence of ADRs in children differ from adults. Les enfants ont plus de risque de décéder d'un EIM ET moins de chance de guérir des EIM par rapport aux adultes. Children are more likely to die from ADRs and less chance of cure ADR compared to adults. L'analyse des scores d'imputabilité montre que les enfants ont plus de risque de développer des effets secondaires par rapport aux adultes. The analysis of the scores of accountability shows that children are more likely to develop side effects compared to adults.Cette étude a permis de démontrer que la pathologie inhérente à l'utilisation des médicaments au sein de la pédiatrie est différente de chez les adultes. This study has demonstrated that the pathology inherent in the use of drugs in paediatrics is different from adults.**

Keywords: Adult, child, adversedrug reaction, accountability, death.

I. INTRODUCTION

According to WHO, most currently available information on adverse events from hospitals. Therefore we used the detection of ADRs even the most serious of them observations from the hospital in two prospective surveys toconduct our study. These investigations have targeted a well-ringed children and Adults and have a significant detection of ADRs even the most serious of them. Since the comparison of adverse reactions between medicated child and adult is interesting and rarely treated, a statistical study comparing adults and children was conducted in June 2009 by the Laboratory of Genetics and Biometrics, Faculty of Science Kenitra with Poison Control and Pharmacovigilance Morocco (CAPM). Indeed, the CAPM has provided all the evidence from the ADR in the exhaustive investigations carried out by his doctors in the university hospital. The departments visited matched pediatric and adult counseling center. The main objective of this study was to compare all adverse drug developed by the adult and child in the hospital Avicenna. Population, Methhjods and Statistics

1) Population

All persons who developed ADRs. In total, one hundred thirty five (135) were studied. The cases selected for our analysis were:

Patients hospitalized during the period for a disease whose cause is likely to be medicated.

Patients who had extended their stay in hospital for an adverse drug reaction. Patients hospitalized with an adverse drug reaction during their hospitalization or during the transition to the hospital (radiology ... ..).

Patient‘s consultant to medical emergencies and consultation center and having an adverse drug reaction.

Patients who have experienced an accidental overdose.

Excluded were patients hospitalized for reasons not drug and / or to a drug overdose voluntary.

2) Data collection

Any adverse reaction reported to doctors, from medical records or reported by patients was analyzed statistically. En effet, la fiche jaune de notification de ces EIM comprenait les informations suivantes : les caractéristiques démographiques, l'histoire médicale, l'indication, le délai d'apparition de l'effet indésirable, la nature de l'effet indésirable médicamenteux, les médicaments impliqués, la gravité de l'effet indésirable, l'évolution de l'effet indésirable, le traitement correcteur, la notion de readministration du produit suspect et les diagnostics différentiels elimines Indeed, the yellow card reporting of ADRs included the following information: demographics, medical history, indication, time to onset of the incident, the nature of the adverse drug reaction, the drugs involved, the severity of the incident, the evolution of the incident, the corrective treatment, the concept of readministration of the suspect product and eliminated the differential diagnosis

3) *Criteria for evaluating the ADR*:

The evaluation of adverse events will be based on the following definitions:

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1. An adverse drug event (ADE), for any damage resulting from the use of a drug or intervention by a health professional on a drug. IatrogenicMedical event may be from a medication error or adverse event. The term Anglo-Saxon corresponding "adverse drug event (ADE).

2. An adverse drug reaction is any adverse effect caused by a health product. A noxious and unintended and occurs at doses normally used in humans for prophylaxis, diagnosis or treatment of a disease or modification of physiological function (WHO, 1972). It is also, a response coincident with the taking of a health product resulting from: Misuse, Overuse Syndrome, Withdrawal Pharmaco dependence, drug error, Ineffective Therapeutic Effect on product design, defective product or poor.

3. A serious adverse drug effect means an adverse reaction which may be the cause: a death or a threat to the life of the patient when the event occurs, or requiring hospitalization or prolongation of hospitalization, leading to sequelae or significant and lasting disability (inability to mean any failure to perform acts of daily life) or that has caused a congenital anomaly or perinatal damage.

4) Variables analyzed

* Demographic variables (age, sex). * Clinical variables (drug side effect, the corrective treatment). * Variables ended (death, healing).

Analysis

Nous avons analysé 135 cas ayant développé des effets indésirables médicamenteux. We analyzed 135 cases who developed adverse drug reactions. The variables that we are interested in our study were gender, age, the drug responsible for the suspected adverse event, the number of adverse effects and the evolution of adverse event (death or not death) (cured or not cured). The statistical analysis was performed using SPSS software and statistical methodology was based on two axes: - Descriptive statistics: frequency and release characteristics of each parameter studied. The results are expressed in gross values for qualitative variables (sex, treatment taken) and mean ± SD for quantitative variables (age). Use - Statistics summary: based association tests such as ANOVA. This test considers the change from the inter group variation (F ratio), whether Accountability (dependent variable) is related to the age of the patient (adult or child) (independent variable). On the other hand, the calculation of relative risk (RR) for every type of patient we were able to detect the degree of association between the age of the patient (adult or child) and corrective treatment on the one hand and between age of the patient (adult or child) and its evolution. If a value is excluded from the confidence interval $_{(95\%)}$ of RR we deduce that there is an association between these two parameters. The method of calculating the score of accountability is French. Accountability intrinsic analysis of cause and effect, not necessarily exclusive, between each drug taken by a given patient and the occurrence of a clinical or paraclinical determined. It is established independently for each medication taken by the patient before the occurrence of this event and is not influenced by the degree of accountability associated drugs. It is based on seven criteria divided into two groups: the chronological criteria threefold and semiological criteria four in number. It shows three possible scores: 4: very likely 3: unlikely 2: plausible

II. Results

A. *Descriptive study*

The number of cases is 135 cases distributed as follows: 113 adult patients developed at least one ADR including the elderly: A total of 167 ADRs were reported among these adults. 22 children developed at least one ADR including infants: A total of 23 ADRs were experienced by these children. The average age of adults with at least one adverse event was 44.73 ± 18.04 years. The age bracket most affected by adverse drug reactions is that between 40 and 49 at the clinic. The average age of children is 5.6 ± 4.4 years. This is the age bracket over 2 years has been affected most by ADRs. In children, antibiotics and antimitotic classes represent the most incriminated in the occurrence of adverse drug reactions. ADRs are attributable to seven antibiotics including 4 serious (Table 1 and 2). In adults, antibiotics (19.04%), anti-inflammatory drugs (17.14%) and antihypertensives (11.42%) are the classes most incriminated in the occurrence of adverse drug reactions. 85.7% of children have received corrective treatment based mainly corticosteroids, antihistamines or antiemetics to correct ADRs. In adults, 46.61% of cases received corrective treatment. The evolution of children who experienced an adverse reaction was positive in 77% of cases, changes in 2 patients could not be clearer because the decline was insufficient, one patient had sequelae (amputation arm) and we deplore the two deaths resulting from a syndrome Lyell and the other related to a severe pancytopenia (Table 3). The evolution of adults with an adverse reaction has been positive in 88% of cases, for 5 patients the pattern has been specified for the decline was insufficient, 3 patients experienced morbidity, and we deplore 4 deaths. In 3 cases, the pattern has been specified because we were unable to obtain information.

B. *Analytical Study*

The results of calculating the relative risk (Table 4) show that: * Adults are less likely to take a corrective treatment those children (RR 0.06 (0.008-0.5).

* Adults are 4 times more likely to cure an ADR that children (RR: 4 (0.7-31).

* Adults are less likely to die from an ADR that children (RR: 0.05 (0.018 to 0.192).

The mean scores of accountability is intrinsic of 3.14 ± 0.7 in adults and 2.06 ± 0802 in children, in this case there is a causal relationship plausible and likely in adults children. The comparison of scores of accountability between children and adults by the ANOVA test shows that the score obtained accountability depends on the type of adult or child patient (F = 31 292) and p = 0.000 in a highly significant.

III. Discussion

Les EIM ont été collectés par les praticiens du CAPM en utilisant la même méthodologie (enquête prospective Durant cinq jours auprès des médecins de l'hôpital Avicennes). The ADRs were collected by practitioners of the CAPM using the same methodology (prospective study over five days with the hospital doctors Avicenna). Cette méthodologie a été présentée à de multiples occasions par d'autres auteurs [8]. This methodology has been presented on numerous occasions by other authors [8]. Tout de même, le nombre des EIM entre les deux groupes est différent: Il est plus abondant chez les adultes car les enfants sont traités avec moins de médicaments [6]. Nevertheless, the number of ADRs between the two groups is different: It is more abundant in adults because children are treated with fewer drugs [6]. The clinical complications due to drugs always concerned primarily with the digestive and skin in both groups. In the child population who have experienced adverse drug reactions, there was a predominance of males as the sex ratio is above 1, which is not true among the adult population: In adults, the predominance of sex is female the vast majority of studies confirm that female gender is most affected by adverse drug reactions [1]. Pharmacokinetic parameters favoring higher According to a study conducted in three departments (pediatrics, neonatology, pediatric surgery) of the Children's Hospital of the University Hospital Hassan II of Fez [7], we note the predominance of males. This is in agreement with our study because in males where one has notified the maximum IMT. Plasma concentrations in women and the increase in reporting of adverse drug reactions can however be expected in that they constitute a group at risk. [4] The therapeutic classes implicated in adverse drug reactions in children differ from adults, this may be because the disease developed in adults are not seen in children. This is consistent with the literature since the therapeutic classes most incriminated in the occurrence of adverse drug reactions in adults are antibiotics, and NSAIDs (1). A prevalence study of ADRs achieved in the USA for 6 years in a pediatric setting [2] showed that it was the antibiotics that are the first cause of ADRs, this is consistent with our result. However, the children's infectious diseases still predominate [3]. Two children, 22 were deceased, and adults are less likely to die from ADRs and children. The death rate among children is a little high because children are vulnerable to drug problems and therefore have need for prevention strategies [6]. Knowing that a child died two months probably due to an antibiotic, ADRs are a significant cause of morbidity in children in general and especially in infants [7], bearing in mind that these complications were collected also from children with cancer who may die because of their tumors. The reduced distance is not significant while the results show that children are likely to develop a higher number of ADRs as adults (M Agouzal personal communication). The mean scores of accountability is intrinsic of 3.14 ± 0.7 in adults: 2.06 ± plausible and 0802 in children: likely, this shows that the cause of the adverse event occurred is more in line with medication use in children. The score of accountability depends on the type of adult or child patient (F = 31 292) and p = 0.000 in a highly significant: accountability is stronger in children, this is related to the collection method information by the investigators because, in adults, the information was collected from the patient so the differential diagnosis have not been eliminated, and thus the accountability score is low, whereas the child is the doctor who delivered the information to investigators and then he filled the form correctly by eliminating the differential diagnoses.

IV. Conclusion

Comparing the results obtained in adults and children shows that the strategy of prevention of adverse drug reactions should be different between the two groups, special attention must be paid to the handling of drugs in pediatric environment.

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Table 1: Distribution of ADRs according to the therapeutic class involved.

Pharmacological Class	Many adverse drug reactions attributable to the pharmacological class
Plasma products	3
Antimitotic	4
Anti-inflammatory	2
Antituberculosis	1
Analgesics	3
Antiinfectives	7
Vaccines	2
Hampoing S	1

Table 2: Distribution of ADRs according to the therapeutic class involved.

Pathology, Hospital for Children	**Nature of adverse drug reactions**	**Drugs involved**
Digestive	Vomiting (5) Cholestatic hepatitis (1)	Analgesics, antibiotics, antimitotic Antituberculosis
Dermatologic	Allergic reaction (10) + Itching eczema (1) Lyell's syndrome (1)	Analgesics, antibiotics, and blood derivatives, vaccines Shampoo Anti-inflammatory
Hematological	Hematemesis (1) Arterial thrombosis (1) Hematological (1) Hemorrhagic syndrome (1) Vasculitis (1)	Anti-inflammatory Antibiotics Antibiotics Antimitotic Vaccines

Table 3: Representation of cases of death in children:

Sex	Male	Female
Age	2 months	12
Indication	Urinary infection	Fever and headache
Drug involved	Triaxon (antibiotic)	Aspro500mg (Analgesic)
Adverse Drug Reactions observed	pancytopenia	Lyell Syndrome

Table 4: Calculation of the relative risk of corrective treatment and changes between adult and child.

	Relative risk (child / adult)
Corrective treatment (Treatment / untreated)	0.06 (0.008-0.5)
Healing (Heal / uncured)	4 (0.7-31)
Death (Deceased / alive)	0.05 (0.018 to 0.192)