

ACUTE FEVER WITHOUT AN APPARENT SOURCE IN YOUNG CHILDREN: EXPERIENCE OF THE PEDIATRIC MEDICAL EMERGENCY DEPARTMENT OF RABAT

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Abstract:-

Introduction *Acute fever without source (FWS) in children is retained after a detailed history and a complete physical examination, in a febrile child and who was previously healthy. This is a common condition that may be the first sign of an invasive infection. The objective of this work is to study the epidemiological, clinical, biological and evolutionary profiles of the FWS and the evaluation of their management.*

Materials and methods *Prospective study carried out from 01 January to 31 April 2015 in the Pediatric Medical Emergency Department of the Rabat Children's Hospital and focused on 130 infants and children between 3 and 36 months who had consulted for FWS.*

Results *Children had an average age of 13.5 months. A female predominance was noted (sex ratio at 0.71). The fever was isolated in 57.7% of the cases, the associated signs were dominated by digestive signs (30%) and general signs (12.3%). FWS etiologies were dominated by: viral infections (59.2%), acute pyelonephritis (39.2%), and 2 cases of viral meningitis (1.5%). The evolution was favorable for all our patients.*

Conclusion *In our context, viral infections are the main etiology of FWS. Bacterial infections are dominated by acute pyelonephritis. A well-conducted initial clinical assessment, combined with a biological check-up, permits ambulatory care, and allows the detection of patients at high risk of severe infection requiring hospital inpatient care.*

Keywords:- *fever without source, children, infection*

INTRODUCTION:-

Fever is the most common chief complaint in children younger than 3 years old seen in the emergency department, accounting for almost one-third of ambulatory visits [1, 2], and the second leading cause of pediatric hospitalization [3]. Infections are the leading cause of death in children under 5 years of age in our country; the fever remains a matter of concern for the parents and the health professionals who take care of the child. The cause of fever is sometimes difficult to identify, despite a careful clinical examination, the clinical condition in children changes frequently and rapidly, and if the child has a serious bacterial infection (SBI), the condition may deteriorate rapidly.

In most cases, fever is due to a viral infection [3, 4], but it may also be the first manifestation of SBI. The distinction between these two groups of diseases is difficult [1]. The challenge for the practitioner is to be able to assess the risk of an SBI in a febrile child and to decide on the management. In addition, the introduction of vaccines against *Haemophilus influenzae* (2007) and pneumococcus (2010) in the vaccine program in Morocco should reduce the incidence of SBI related to these germs and influence the management decision [3, 5].

Acute fever without source (FWS) in children is retained after a detailed history and a complete physical examination, in a febrile child and who was previously healthy. This is a common condition that may be the first sign of an invasive infection [4]. The objective of this work is to study the epidemiological, clinical, biological and evolutionary profiles of the FWS and the evaluation of their management.

MATERIALS AND METHODS:

This is a prospective, descriptive and analytical study carried out between 01 January and 31 April 2015 at the Pediatric Medical Emergency Department of the Rabat Children's Hospital which is a tertiary level university teaching hospital, it drains pediatric emergencies in the region of Rabat Salé Zamour Zair (region in northwest Morocco and populated by more than three million inhabitants) and receives an average of 200 children per day. Consultations in pediatric emergency rooms are carried out by pediatric resident doctors and internal doctors, supervised by two pediatric professors' 24-hour standby duty. Were enrolled in this study, all children aged 3 months to 36 months who were consulted for acute fever (less than 5 days in young children and less than 7 days in infant) measured or not, isolated or associated with other symptoms, and in whom no etiology is retained after a detailed anamnesis and a complete physical examination. Children with focal bacterial infection, chronic illness, those who received antibiotic therapy in the past 72 hours and those who consulted elsewhere after their first visit to the service, were excluded from our study. The data were collected using a pre-established questionnaire, with the informed consent of the accompanying parent. The parents were contacted by phone to assess the progress of their children. Data analysis was carried out using the SPSS software. The differences were considered significant at the $p < 0.05$.

RESULTS:

1- Characteristics of the population studied: (TABLE 1)

The 130 children included had an average age of 13.5 months (3 months and 10 days - 32 months), 93.1% of the patients were younger than 24 months. A female predominance was noted (76 girls and 54 boys) with a sex ratio of 0.71. All patients received immunization according to the national immunization program. A recent vaccination concept was found in 4 patients. The temperature was measured at home in 64.6% of the cases, 78.5% rectally. The average temperature was 39.3 °C. The fever was isolated and well tolerated in 57.7% of the cases, the associated signs were dominated by digestive signs (vomiting 19.3%, diarrhea 25%, abdominal pain 11.3%, and general signs (asthenia 12%, Anorexia 10.5%). The time between onset of fever and consultation was 2.8 days on average. Ninety-two percent of our patients received antipyretics at home. Paracetamol was the reference treatment (75% of cases), compared with ibuprofen (15% of cases). The association of antipyretics is found in 10% of cases. The response to antipyretics was satisfactory in 85.2% of cases. 96.1% of the patients had tolerated fever, and four patients presented a toxic appearance, the patients were systematically hospitalized. After exploration, there were two cases of acute pyelonephritis (APN), one case of viral meningitis, and one case of viral infection.

Table 1: characteristics of the study population

Variable	Effective	Percentage	Variable	Effective	Percentage
Sex :			ATP treatment		
Male	54	41,5%	No	10	7,7%
Female	76	58,4%	yes	120	92,3%
Age :			Type of ATP		
3-6months	19	14,6%	Paracetamol	90	75%
6-12months	47	36,1%	Ibuprofen	18	15%
12-24months	56	43%	Paracétamol+ibuprofen	12	10%
24-36months	8	6,1%			
T° at home :			Tolerance of fever		
No	46	35,3%	Tolerated	125	96,1%
Yes	84	64,6%	Not tolerated	5	3,8%
Site of measurement :			Temperature's degree		
Rectal	66	78,6%	37 (with ATP)	19	14,5%
Axillary	18	21,4%	37-38,4	27	20,6%
			38,5-39	51	38,9%
			>39	34	26%
Associated signs :			Toxic appearance:		
Isolated fever	75	57,7%	No	126	96,9%
General signs	16	12,3%	yes	4	3%
Digestive signs	39	30%			
Duration of fever:					
<24 hours	11	8,4%			
1-3days	79	60,3%			
4-7days	41	31,3%			

ATP=antipyretic, T°= temperature

2 – Practice patterns in pediatric emergencies, etiologies and evolution of FWS: TABLE 2

After anamnesis and clinical examination of the patients, the procedures to be followed by the doctors of the pediatric emergency departments were as follows:

- Give an antipyretic and monitor the temperature at home (19.2% of consultations for acute tolerated fever not exceeding 48 hours) with a clinical re-evaluation within 24 to 48 hours.
- Diagnostic testing in patients with acute tolerated fever evolving for more than 48 hours without other associated signs in 77.7% of cases. Thus, Cytobacteriological examination of urine was systematically requested associated with C-reactive protein in 88% of cases, blood count in 13% of cases, chest radiograph in 17% of cases, and lumbar puncture in 3 patients.
- Systematic hospitalization in patients with intolerated acute fever with signs of toxicity in 4 patients. The etiologies of FWS were dominated by: viral infections (59.2%), APN (39.2%), and two cases of viral meningitis (1.5%).

The evolution was favorable for all our patients.

Table 2: practice of Pediatric Emergency Doctors in a FWS

Variable	Effective	Percentage
Management :		
ATP	25	19,2%
Hospitalization	4	3%
Laboratory tests	101	77,7%
CRP :		
Negative	34	37,4%
< 60mg/l	30	33%
>60mg/l	27	29,7%
CBEU		
Negative	56	51,9%
Positive	51	47,2%

Table 3: Diagnosis and management of FWS

Diagnosis		
APN	51	39,2%
Viral infection	77	59,2%
Viral meningitis	2	1,5%
Management		
Symptomatic treatment	76	58,4%
Hospitalization	54	41,5%

3 - Statistical characteristics comparison of APN and viral infection: TABLE 3

APN was more frequent in girls (66.7%), especially those aged 6-12 months (45.1%). At the time of the consultation, fever exceeded 3 days in 47.1% of APN cases ($P < 0.001$). Fortythree percent of patients with APN had a temperature of 38.5 ° or higher. Patients with a viral infection had a temperature above 39 ° in 26% of cases. Viral infections generally occurred in patients aged 12-24 months (46.8%) with a slight female predominance (55.8%). 51% of patients with APN presented with fever associated to digestive signs. Fever was isolated in 67.5% of viral infections ($P < 0.001$). CRP was greater than 60 mg/l in 61% of APN cases, and when it was requested for viral infections, it was negative in 72.3% and less than 60 mg / l in 27.7% of cases. ($P < 0.001$).

Table 3: characteristics of APN and viral infection

	APN	Viral infection	P
Sex :			
Male	17 (33, 3%)	34 (44, 2%)	0,270
Female	34 (66, 7%)	43 (55, 8%)	
Age :			
3-6months	6 (11, 8%)	12 (15, 6%)	0,376
6-12months	23 (45, 1%)	23 (29, 9%)	
12-24months	19 (37, 3%)	36 (46, 8%)	
24-36months	3 (5, 9%)	6 (7, 8%)	
Associated signs :			<0,001
Isolated fever	21 (41, 2%)	52 (67, 5%)	
General signs	4 (7, 8%)	11 (14, 3%)	
Digestive signs	26 (51%)	14 (18, 2%)	
Duration of fever:			<0,001
<24h	0 (0%)	11 (14, 3%)	
1-3 days	27 (52, 9%)	51 (66, 2%)	
4-7 days	24 (47, 1%)	15 (19, 5%)	
Tolerance of fever:			0,306
Tolerated	48 (94, 1%)	71 (98, 6%)	
Not tolerated	3 (5, 9%)	1 (1, 4%)	
Temperature			0,570
37°	9 (17, 6%)	10 (13%)	
37°-38,4°	13 (25, 5%)	14 (18, 2%)	
38,5°-39°	17 (33, 3%)	33 (42, 9%)	
>39°	12 (23, 5%)	20 (26%)	
Toxic appearance :			NS
No	45 (95, 7%)	43 (97, 7%)	
Yes	2 (4, 3%)	1 (2, 3%)	
CRP :			<0,001
Negative	0 (0%)	34 (72, 3%)	
<60mg/l	16 (39%)	13 (27, 7%)	
>60mg/l	25 (61%)	0 (0%)	

DISCUSSION

Fever is defined as a temperature higher than or equal to 38 ° C. It is one of the most frequent reasons for consultation in pediatrics [6, 7]. It is important to appreciate its tolerance, to specify its origin and to ensure its management.

The temperature taken at home should be considered as taken by the practitioner [1, 2, and 9].

In the context of "acute" fevers, the clinician must be able to quickly identify emergency situations:

- Toxic appearance: this is an aspect that is retained in the presence of one or more of the following signs: cyanosis, signs of hypoperfusion, tachycardia, hyper- or hypoventilation, decreased activity, inability to interact with parents Or with the environment, irritability, lethargy, or low visual contact [4, 5, 9]. The toxic appearance is a sign of severity and high risk of SBI.
- Severe bacterial infections that include: pneumonia, meningitis, cellulitis, osteo-articular infection, bacteremia-septicemia, bacterial gastroenteritis, acute pyelonephritis, soft tissue infection and bacterial enteritis [9].
- Risk groups: child or infant with chronic pathologies (heart disease, pneumonia, malformative uropathy), immune deficiency, sickle cell disease and others.

These emergency situations must lead to a specific treatment, and propose symptomatic treatment, in order to limit the complications and ensure the comfort of the child.

The methods capable of ensuring optimal antipyretic treatment are both physical and medicinal [8].

For the choice of antipyretics, paracetamol or ibuprofen are the only ones recommended for use in febrile children, but they should not be used at the same time. The alternative product can only be considered if the child does not respond to the first product [1, 3]. The use of acetylsalicylic acid in children is not recommended because of the risk of Reye's syndrome [1].

Monotherapy is usually effective, with parental education focused on both therapeutic strategy and monitoring elements [8]. In our series, paracetamol was the reference treatment (75% of cases), before ibuprofen (15% of cases). The association of antipyretics is found in 10% of cases.

In France, paracetamol is the most widely used antipyretic drug, with almost 60% of prescriptions in infants, 25% for ibuprofen, and 5% for aspirin [8]

FWS may be the first sign of invasive infection. The initial clinical examination should allow the identification of children at risk for potentially severe infections, for whom hospitalization and supplementary tests are justified [4, 5].

Child fever is only a symptom and therefore requires a rigorous clinical examination by a physician trained in the symptomatology of the child and especially of the infant [9].

Fever is most often associated with benign viral infection spontaneously resolving [3, 4]. In about 80% of the cases, the fever is accompanied by symptoms allowing easier etiological diagnosis.

The prescription of additional tests is justified only in the case of:

- Risk groups
- Clinical signs suggestive of serious bacterial infection or intolerance (4 cases in our series who have been hospitalized and have evolved well: 2 cases of APN, 1 case of viral meningitis and one case of viral infection)
- Persistent fever over 3 days with no clinical appeal in young children, or more than 5 days at all ages. In our series, the complementary tests that were requested in patients with a FWS lasting more than 48 hours were positive in 48.5% of cases [8]

Depending on the situation, the following additional test may be prescribed:

- Hematological tests: complete blood count (CBC) ; C-reactive protein (CRP), procalcitonin (PCT) (if available);
- systematic and targeted bacteriological tests: urinalysis and / or cytbacteriological examination of urine (CBEU), blood culture (s), cerebrospinal fluid (CSF) analysis; •Targeted radiography testing: chest X-ray

Hospitalization is systematic in newborns, as well as in infants under 3 months of age, with signs of potentially severe infection. It may be discussed in older infants with intolerance signs or signs suggestive of serious bacterial infection [10]. The most usual management outside of these situations is ambulatory.

The family's understanding of prescription should be assessed, indicating that a viral illness can cause fever lasting up to 3 days and should be respected. It is also necessary to transmit to the family, without alarming it, the signs of gravity leading to another urgent consultation: complexion anomalies, abnormal cries, inconsolable crying, consciousness disorder, hemodynamic disorder. We often find gaps in parents' basic knowledge and usual practices against fever. We propose more awareness and education campaigns for parents to manage fever in children.

FWS is difficult because it may be related to an occult bacterial infection, whose diagnosis makes use of complementary tests. Thus, a 2-year study (from July 1, 2004 to June 30, 2006) from an Australian cohort of 15,781 children under five consulting in pediatric emergencies for isolated fever reported a prevalence of serious bacterial infections SBI of 7.2%. These bacterial infections are composed of 3.4% of urinary infections, 3.4% of pneumonia, 0.4% of bacteremia and 0.1% of meningitis [11, 12].

A retrospective study was carried out in Casablanca, conducted over a year, from January 1 to December 31, 2004, on 589 patients aged 3 to 36 months, collected in the pediatric emergency department and in pediatrics 1. The FWS represented 1.34 % of all consultants. 41% of them were hospitalized. The study of the inflammatory analysis showed that its positivity

is statistically related to the occurrence of an SBI. SBI was diagnosed in 24.4% of the 242 inpatients. The findings were urinary infections (69.5%), pneumonia (13.5%), occult bacteremia (10.2%), and bacterial meningitis (2.8%) [13]. In our context, complementary tests are not always systematic. Viral infections are the main etiology of FWS. Bacterial infections are dominated by APN. Our study joins the results of the other series.

CONCLUSION

FWS represents 10-20% of acute fever in children aged 3 months to 3 years old [14]; A wellconducted initial clinical assessment, combined with a biological check-up, permits ambulatory care, and allows the detection of patients at high risk of serious infection requiring hospital inpatient care. In addition, two important principles must be respected: the need for re-evaluation within 24 to 48 hours and No antibiotics without bacteriological samples. In the future, more forward-looking studies are needed to improve evaluation and management of FWS.

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