Determinants of fever duration in acute pyelonephritis.

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Background

Acute pyelonephritis (AP) is a common medical illness that may require hospitalisation.

The presence of fever is used both for diagnosis and to follow up treatment response. Several infectious diseases textbooks recommend that after 2 to 3 days of continued fever, obstruction or abscess formation is suspected. It is also frequent that clinician modify antibiotic regimen if fever persists after 72 hours of antibiotics.

The aim of this study was to determine predictor factors of fever duration in AP and its impact on antibiotic modalities.

Methods

Setting: Retrospective study made in the Department of Infectious Disease, university hospital in Monastir, Tunisia.
All medical records of patients with a pyelonephritis were retrospectively reviewed from 2002 to 2012.
Inclusion criteria: age $\geq$ 15 yo, Temp $\geq$ 37.8 ° C on admission, back pain and/or urinary symptoms, leukocyturia $\geq$ 10 leucocytes/mm^3 and bacteriuria $\geq$ 10^5 CFU/ml.
Exclusion criteria: absence of fever, negative urine culture, nosocomial pyelonephritis, pyonephrosis, anthrax, kidney abscess or perinephretic phlegmon.
Definitions: In our study, the delay of apyrexia **(DOA)** was defined as the time required to the resolution of fever. The delay of apyrexia was considered prolonged if fever lasted more than 72 hours.
Statistical analysis: Data analysis was performed using the SPSS version 17.0 and p-value < 0.05 was considered statistically significant.
A multivariate stepwise logistic regression was used to identify factors associated to prolonged fever.

Results

412 patients were included, 290 (70.4%) were female. The mean age was 45 $\pm$ 20.6 years (15–90 years old).

Pyelonephritis was complicated in 246 cases (59.7%).

Mean duration of hospitalization was 9.6 $\pm$ 6.2 days (1–74 days).

Mean delay of apyrexia was 59 $\pm$ 42 hours (12–240 hours). The fever was prolonged in 132 patients (32%).

The duration of antibiotic therapy was not influenced by the delay of apyrexia (p=0.51), but the patients with prolonged fever were hospitalized for longer (p = 0.002).

Table 1: clinical and laboratory data.

Data	Number
Epidemiological data, number (%)	
* Age, mean $\pm$ DS, years	45 $\pm$ 20.6
* Age $\geq$ 65 years	95 (23.1)
* Masculine gender	122 (29.6)
* History of pyelonephritis	115 (28)
* Diabetes	92 (22.3)
* Menopause	77 (26.6)
Clinical data, N (%)	
* Temperature	38.7 $\pm$ 0.72
* Chills	275 (62.4)
* Back pain	384 (93.2)
* Associated prostatitis	39 (32)
Laboratory data, mean $\pm$ DS	
* WBC count ($\times 10^3$/mm^3)	12.46 $\pm$ 5.6
* CRP (mg/l)	100 $\pm$ 69
* Creatinine (μmol/l)	92 $\pm$ 51
* Acute renal failure, N (%)	66 (16)
Radiologic data, N (%)	
* Urinary lithiasis	36 (8.7)
* Pyelocaliceal dilatation	50 (12.3)
Therapeutic data, N (%)	
* Monotherapy	367 (88)
* Parenteral	282 (68.4)
* Duration, mean $\pm$ DS (days)	15 $\pm$ 8

Table 2: association of dependent variables with fever duration.

Data	DOA < 72 hrs (n = 280)	DOA $\geq$ 72 hrs (n = 132)	p
Age, mean $\pm$ DS	44.3 $\pm$ 20.3	46.3 $\pm$ 21.3	0.36
Masculin gender, N (%)	81(28.9)	41(31.1)	0.65
History of pyelonephritis, N (%)	86 (30.7)	29 (22)	0.065
Diabetes, N (%)	63 (22.5)	29 (22)	0.9
Complicated pyelonephritis, N (%)	169 (60.4)	77 (58.3)	0.69
Temperature on admission, mean $\pm$ DS	38.58 $\pm$ 0.7	38.77 $\pm$ 0.7	0.011
Temperature on admission $\geq$ 39°C, N (%)	97 (34.6)	62 (47)	0.016
Prostatitis, N (%)	27 (33.3)	12 (29.3)	0.64
Calculi, N (%)	25 (8.7)	11 (8.3)	0.84
Pyelocaliceal dilatation, N (%)	33 (11.8)	17 (12.9)	0.75
White blood cell count $\pm 10^4$/mm^3	169 (60.4)	94 (71.2)	0.032
CRP, mean $\pm$ DS (mg/l)	96 $\pm$ 67.3	108.9 $\pm$ 71.7	0.076
Creatinine (μmol/l), mean $\pm$ DS	90 $\pm$ 50.4	96 $\pm$ 52	0.27
Acute renal failure, N (%)	40 (14.3)	26 (19.7)	0.16
Isolation of *E. coli* in urine culture, N (%)	219 (78.2)	115 (87.1)	0.031
Positive blood culture, N (%)	11 (3.9)	17 (12.9)	0.001
Treatment with 2 antibiotics, N (%)	22 (7.9)	23 (17.4)	0.04
Parenteral antibiotic therapy, N (%)	186 (66.4)	96 (72.7)	0.19

Table 3: Factors associated with prolonged fever in multivariate analysis.

Characteristics	OR	95% CI	p
Positive Blood culture	3.10	[1.36 – 6.98]	0.007
Isolation of *E. coli*	1.93	[1.03 – 3.59]	0.039
Leucocytosis	1.66	[1.05 – 2.63]	0.029
Initial t with two antibiotics	2.77	[1.41 – 5.44]	0.003

Conclusion

In summary, fever can persist up to 72 hours in treated acute pyelonephritis, and routine urologic investigations and change of therapy after 2 to 3 days of fever mat not be warranted. Prolonged fever may represent a normal response to appropriate therapy rather than a complicated course.
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