

# Complicated urinary tract infections: heterogeneity among hospitals.

## A retrospective observational cohort study.

### Results of the COMBACTE-MAGNET, RESCUING study

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#### Background:

Urinary tract infections (UTI) are highly prevalent worldwide. Complicated UTI (cUTI) is an entity defined by the FDA and EMA and serves for inclusion of patients into trials of antibiotic management, including new antibiotics. In a large multinational cohort study we aimed to examine the heterogeneity among hospitals in the characteristics and management of patients with cUTI.

#### Material/methods:

We performed a retrospective, observational, multinational and multicenter cohort study. The study was conducted in 20 hospitals around Europe, Turkey and Israel. Approximately 50 consecutive cases of cUTI were included from each site. The study involved collection of data of hospitalised patients between 01/01/2013 and 31/12/2014. Patients with a diagnosis of cUTI as the primary cause of hospitalisation and patients who developed cUTI during their hospital stay were included. To avoid selection bias, all consecutive patients who had ICD-9 or ICD-10 CM codes were reviewed at each site. The main outcome was treatment failure.

#### Results:

Overall, 989 patients with cUTI were included. The median age of the cohort was 68 (IQR 56-80). Approximately, 18% resided at long term medical facilities and 16% were bedridden patients. Patients presented with multiple comorbidities; 26.8% (275/989) had diabetes mellitus, 27.8% (275/989) had chronic kidney disease and 19.1% (189/989) had congestive heart failure. The treatment failure rate was 26.6% (261/981) and ranged from 5% to 61.6% between hospitals. The crude 30-day-all-cause mortality rate was 8.7% (85/976) and ranged from 0 to 25.9% between hospitals. The

median LOS ranged from 5.9 days to 20.7 days between hospitals and the median age ranged from 53.7 to 78.1. Further data on the differences between the hospitals can be seen in Table 1. The percentage of pyelonephritis did not explain the huge heterogeneity among hospitals. Treatment failure rate by different type of UTI infections is presented in Table 2.

Table 1: Descriptive statistics of main variables per hospital

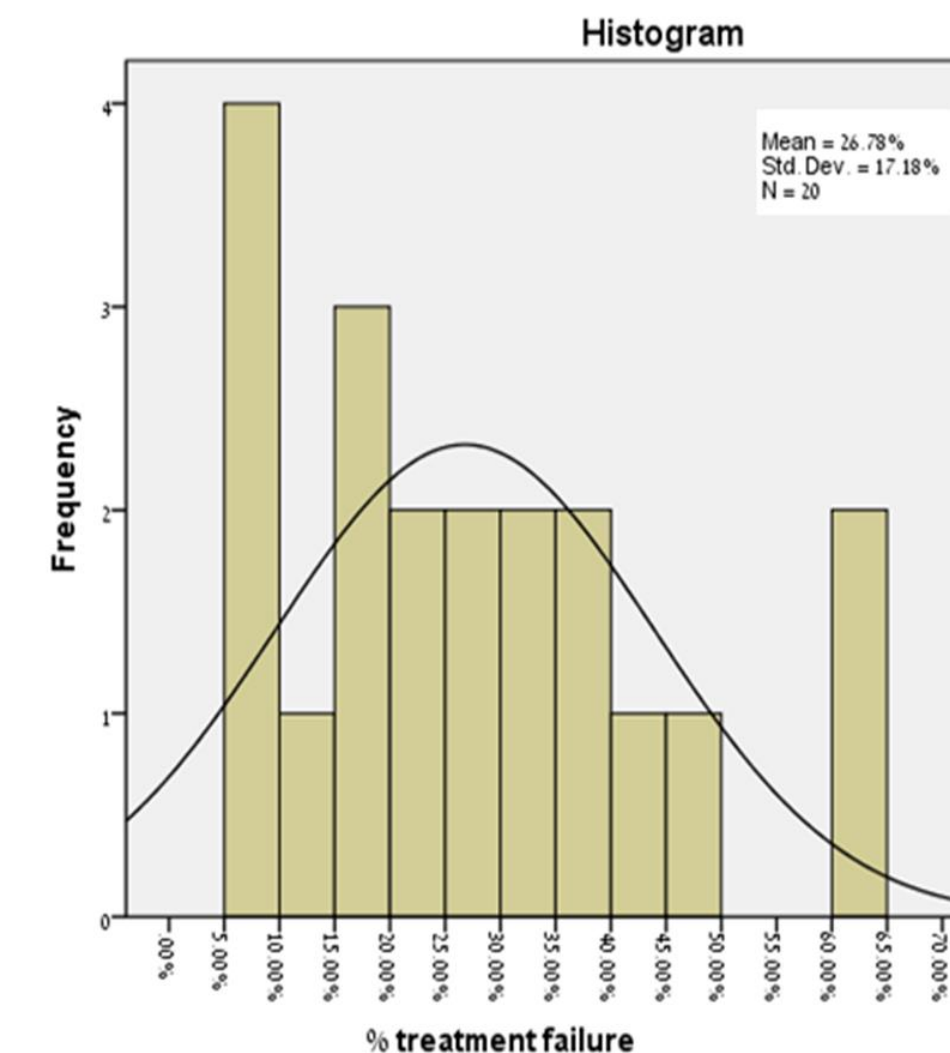
Variable	minimum	25%	50%	75%	Maximum
Mean Age	53.7	60.5	65.4	69.4	78.1
% Male (sex)	15.4	39.1	45	54.3	66.7
% Pyelonephritis	0	5.4	13.5	33.3	44.8
% Ultrasound examinations	26.7	40.7	45.8	62.3	95
% Abdominal computerized tomography scan	1.3	6.9	10.5	18.2	72
% Treatment failure	5	12.8	24.2	38	61.6
% 30 day mortality	0	0.8	7.8	14.7	25.9
Mean Length of hospital stay, days	5.8	9.4	11.1	15.1	20.6

Table 2: Treatment failure by type of UTI infection

Type of UTI infection	Treatment failure (%)
Indwelling catheter	137/336 (40.8%)
Pyelonephritis	28/197 (14.2%)
Other*	96/448 (21.4%)

\* Anatomical urinary tract modification, obstructive uropathy, other events.

Figure 1: Histogram and normality curve demonstrating the percent of treatment failure among hospitals



#### Conclusions:

The large heterogeneity among hospitals raises questions and concerns regarding the cohesion of the complicated UTI definition as is often used in antibiotic clinical trials.