Epidemiology and Resistance Patterns of Urinary Pathogens in Children less than Three Years Old

Sir,

A regional SARI (Strategy for the Control of Antimicrobial Resistance in Ireland) 2008 report on urinary tract isolates from patients of all ages in North Dublin found significant resistance to amoxicillin and trimethoprim amongst E. coli and to co-amoxiclav, nitrofurantoin and trimethoprim amongst other Enterobacteriaceae. coli bloodstream isolates in Ireland resistant to gentamicin in 2008, there may be concerns regarding recommending any of these antimicrobials as empiric treatment for urinary tract infections (UTIs). Due to these concerns, we analysed the epidemiology and resistance patterns of isolates from urine specimens from children <3 years old submitted over 13 months (November 2008- November 2009 inclusive) to the Children’s University Hospital, Temple Street (CUH, an acute secondary and tertiary referral paediatric hospital serving Dublin North City and County). All urines with >10 white cells/mm³ and a pure culture or a predominant growth culture of >104 colony forming units/ml in children <3 years old were included.

Figure 1: Resistance amongst urinary tract isolates from children < 3 years old in the Children's University Hospital, Temple Street
Amox = Amoxicillin; Aug = Co-amoxiclav; Gen = Gentamicin; 1GC = First generation cephalosporins; Cef = Cefotaxime; Nf = Nitrofurantoin; Tri = Trimethoprim; Cfu = Cefuroxime; P. aerug/NF = Pseudomonas aeruginosa and other non-fermenting Gram-negative bacilli; Staph. spp = Staphylococcus species; Other GNs- Other Gram-negative bacilli
* Nitrofurantoin susceptibility testing not routinely performed on Enterococcus spp and Staphylococcus spp in CUH

Five hundred urine results from 457 patients (62% female, 37% male, 1% unknown) were included. 429 (85.8%) were taken in A&E, the remainder were from inpatients. E. coli accounted for 411 (82.2%). The remainder were due to Enterococcus spp. (n=33, 6.6%), Pseudomonas aeruginosa (n=15, 3%), Klebsiella spp. (n=14, 2.8%), coagulase negative staphylococci (n=10, 2%), Proteus mirabilis (n=9, 1.8%), Staphylococcus aureus (n=3, 0.6%), Citrobacter spp. (n=2, 0.4%), and Enterobacter cloacae (n=1, 0.2%). Serratia spp. (n=1, 0.2%), and Stenotrophomonas maltophilia (n=1, 0.2%), respectively (see Figure 1). However, only 4.8% were resistant to the amoxicillin/ gentamicin combination. Resistance to gentamicin occurred in 2.9% of E. coli and 3.7% of other Enterobacteriaceae. 2.4% of E. coli and 0% of other Enterobacteriaceae were resistant to third-generation cephalosporins. Overall, 37.4% were resistant to trimethoprim (468 tested), 15.4% to co-amoxiclav (500 tested), 20% to first-generation cephalosporins (500 tested), 8.8% to nitrofurantoin (456 tested) and 3.6% to ciprofloxacin (497 tested).

A combination of amoxicillin and gentamicin remains an appropriate empiric regimen for treatment of UTI in children <3 years old requiring hospitalisation at CUH. We believe nitrofurantoin to be the most appropriate oral recommendation for lower UTI. Bacteria rarely develop resistance to nitrofurantoin, probably due to the fact that it does not achieve significant levels in intestinal or vaginal tissues and does not alter the normal flora, minimized through use of the microcrystalline formula (e.g. Furadantinfi) and administration with meals. despite the log levels of resistance noted, should not be used empirically given the risk of emergence of resistant organisms. Resistance to gentamicin and third-generation cephalosporins in urinary tract isolates of E. coli and other Enterobacteriaceae from children <3 years old is not a significant problem, particularly when compared with the national surveillance data of bloodstream isolates from patients of all age groups.

Gastrointestinal upset can be minimized through use of the microcrystalline formula (e.g. Furadantinfi) and administration with meals.

References
2. HPSC European Antimicrobial Resistance Surveillance System Quarter 1 Surveillance Report 2009. Available at www.hpsc.ie

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