Rising Levels of Antibiotic Resistance in Bacteria: A cause for Concern

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Antibiotic resistance of common pathogenic bacteria is a very serious trend in modern era all over the world. This is the reason for increased morbidity and mortality in hospital as well as the community settings. Published data from different parts of India show a similar ominous trend.

We here want to bring to your notice a recent series of antibiotic sensitivity reports of bacteria as obtained from patients admitted in our institution (a tertiary care centre of Eastern India). The patients hailed from both rural and urban areas.

As the above table shows, age range of the patients was from 43 to 77 years. While some (3 out of 7) patients were diabetic, the rest were without any apparent immunosuppressive condition.

All the organisms were gram negative bacteria. The only antimicrobials they were sensitive to (in most cases) were the polymyxins. This is the last line of treatment against bacteria in present times. We had to use Polymyxin B or colistin (Polymyxin E) in all the above cases for prolonged periods. The average stay in hospital for these patients was 16.1±5.5 days. There was no mortality.

Acinetobacter has been known to develop resistance to antibiotics extremely rapidly. In early 1970, the bacterium was sensitive to almost all available antibiotics. But by 1975, resistance to cephalosporins started to emerge. By 2000, the documented resistance to imipenem was extremely high in Europe. Later, Acinetobacter resistance to carbapenems was documented to be 85% from Greece and 87% from USA. Thus, tigecycline and polymyxins are the only useful agents available against this bacteria. But recently, some reports have shown an emerging resistance to colistin also. A report from Germany has recently documented a 6% prevalence of resistance to tigecycline.

Escherichia coli is a ubiquitous organism in different clinical conditions. Drug resistance of this organism has been growing steadily in recent times. Studies from India have shown a growing trend of drug resistant E. coli infections. A recent multi-centre study from India showed almost 60% of E. coli specimens to be ESBL producing. Carbenem resistance has also emerged for E. coli. Recently, a report from USA documented colistin resistant E. coli. This was due to a plasmid-mediated gene.

In general, the level of drug resistance in gram negative clinically important bacteria has increased significantly. This has resulted in higher hospital stay, higher rate of invasive procedures and mortality. A recent cost analysis estimated that antibiotic drug resistance led to an attributable cost increase of approximately $10,000 per patient.

However, it must be remembered that in vitro susceptibility does not always correlate with in vivo sensitivity. Hence, any antibiotic sensitivity report must be interpreted with caution. Both the drug resistance pattern and the minimum inhibitory concentration (MIC) must be reported, especially for drugs like Tigecycline.

In conclusion, we want to draw the attention of the readers towards this growing menace in daily clinical practice. Our case series generates the data from Eastern India. A proper antibiotic stewardship and drug resistance surveillance program is urgently needed. Such a program must have not only a clinical dimension but also a public health dimension.

Abbreviations
ESBL: extended spectrum beta lactamase; USA: United States of America

References