In The Era Of Antimicrobial Resistance, What Is The Characteristics Of Microorganisms Isolated In Naser Medical Complex?

Prep. By:
Dr. Alaa Eldeen Elmassry
Consultant Internist,
Egyptian Board of Internal Medicine (E.B.I.M.),
Palestinian Board of Internal Medicine (P.B.I.M.),
Infection control diploma,
Basic certificate of geriatric medicine
Head Of The Medical dept., Naser hosp.

Memorable Quotes…

„If one looks around the medical scene of north America and Australia he will see the rapidly diminishing importance of infectious diseases.
The fever hospital is vanishing or being turned to other uses „
With full use of knowledge we already posses the effective control of each infectious disease with exception of polio„,

1951, Sir Frank Macfarlane Burnet
Nobel prize in medicine 1960
„It is time to close the book of infectious disease and declare the war against pestilence won,“

Dr. William H Steewart US surgeon, 1965

„Even with my great personal loyalty to infectious disease, I can't conceive of the need for 309 graduating trainees in infectious disease unless they spend their time culturing each other,“

Dr. Robert Petersdorf, 1978 ©
Antibiotic-Resistant Bugs in the 21st Century — A Clinical Super-Challenge

Cesar A. Arias, M.D., Ph.D., and Barbara E. Murray, M.D.

In March 1942, a 33-year-old woman lay dying of streptococcal sepsis in a New Haven, Connecticut, hospital, and despite the best efforts of contemporary medical science, her doctors could not eradicate her bloodstream infection. Then they managed to obtain a small amount of a newly discovered substance called penicillin, which they cautiously injected into her. After repeated doses, her bloodstream was cleared of streptococci, she made a full recovery, and she went on to live to the age of 90.1 Sixty-six years after her startling recovery, a report2 described a 70-year-old man in San Francisco with endocarditis caused by vancomycin-resistant Enterococcus faecium (VREF). Despite the administration, for many days, of the best antibiotics available for combating VRE, physicians were unable to sterilize the patient’s blood, and he died still bacteremic. We have come almost full circle and arrived at a point as frightening as the preantibiotic era: for patients infected with multidrug-resistant bacteria, there is no magic bullet.

It is difficult to imagine undertaking today’s surgical procedures, transplantations, cancer chemotherapy, or care of the critically ill or HIV-infected without effective antimicrobial agents. Bacteria are champions of evolution, and a few microbes have adapted to a point where they pose serious clinical challenges for humans. Among the gram-positive organisms, methicillin-resistant Staphylococcus aureus (MRSA) and E. faecium represent the biggest therapeutic hurdles (see table). The evolution of MRSA exemplifies the genetic adaptation of an organism into a first-class multidrug-resistant pathogen. After the introduction of penicillin and, later, methicillin, S. aureus quickly developed resistance to these β-lactam compounds, and by 2003, more than 50% of S. aureus isolates recovered in U.S. hospitals were MRSA.

Over the last 30 years, no major new types of antibiotics have been developed
Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services (HHS) estimates that annually at least two million illnesses and 23,000 deaths are caused by antibiotic-resistant bacteria in the United States alone.
The goals of the National Action Plan include:

1. Slow the Emergence of Resistant Bacteria and Prevent the Spread of Resistant Infections.


### TABLE 1: National Targets to Combat Antibiotic-Resistant Bacteria

By 2020, the United States will:

**For CDC Recognized Urgent Threats:**
- Reduce by 50% the incidence of overall *Clostridium difficile* infection compared to estimates from 2011.
- Reduce by 60% carbapenem-resistant Enterobacteriaceae infections acquired during hospitalization compared to estimates.
- Maintain the prevalence of ceftriaxone-resistant *Neisseria gonorrhoeae* below 2% compared to estimates from 2013.

**For CDC Recognized Serious Threats:**
- Reduce by 35% multidrug-resistant *Pseudomonas* spp. infections acquired during hospitalization compared to estimates from 2011.
- Reduce by at least 50% overall methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections by 2020 as compared to 2011.*
- Reduce by 25% multidrug-resistant non-typhoidal *Salmonella* infections compared to estimates from 2010-2012.
- Reduce by 15% the number of multidrug-resistant TB infections.¹
- Reduce by at least 25% the rate of antibiotic-resistant invasive pneumococcal disease among <5 year-olds compared to estimates from 2008.
- Reduce by at least 25% the rate of antibiotic-resistant invasive pneumococcal disease among >65 year-olds compared to estimates from 2008.

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### Power of Antibiotics

<table>
<thead>
<tr>
<th>Disease</th>
<th>Pre-Antibiotic Death Rate</th>
<th>Death With Antibiotics</th>
<th>Change in Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Pneumonia¹</td>
<td>~35%</td>
<td>~10%</td>
<td>-25%</td>
</tr>
<tr>
<td>Hospital Pneumonia²</td>
<td>~60%</td>
<td>~30%</td>
<td>-30%</td>
</tr>
<tr>
<td>Heart Infection³</td>
<td>~100%</td>
<td>~25%</td>
<td>-75%</td>
</tr>
<tr>
<td>Brain Infection⁴</td>
<td>&gt;80%</td>
<td>&lt;20%</td>
<td>-60%</td>
</tr>
<tr>
<td>Skin Infection⁵</td>
<td>11%</td>
<td>&lt;0.5%</td>
<td>-10%</td>
</tr>
</tbody>
</table>

*By comparison...treatment of heart attacks with aspirin or clot busting drugs⁶*
Examples of Microorganisms isolated in urine cultures in Naser hospital

- **E. Coli**
- **STAPHYLOCOCCUS AUREUS**
- **Klebsiella**
- **Streptococcus**

**Resistance of E. Coli isolated in urine cultures**

[Bar chart showing resistance levels of various antibiotics against E. Coli]
**Staphylococcus**

97-staphylococcus cases of 735 positive of totally 2019 cultures

**Resistance**

![Bar chart showing resistance levels to various antibiotics](chart.png)
Klebsiella

74-Klebsiella cases of 735 positive of totally 2019 cultures

Resistance

[Bar chart showing resistance levels to various antibiotics]
Sensitive

Almost Equal
Streptococcus

51-Streptococcus cases of 735 positive of totally 2019 cultures

Resistance

- penicillin G
- ampicillin
- oxacillin
- co trimethoprim

R
S
Microbiological Characteristics of Staphylococcus Aureus in naser hospital

![Graph showing the effectiveness of penicillin G against Staph A.](image)
Isolated Resistant Bacteria to Meropenam in Naser Hospital in 2010
Conclusions ....

- All uropathogens in Nasser Medical Complex are considered multidrug resistant pathogens
- All of them have significant resistance to co-trimethoprim, which is OTC drug for UTI now!
- *E. coli*, Staphylococcus and Klebsiella have significant resistance to amoxicillin, augmentin, ampicillin and most of cephalosporins
  - Vancomycin still have excellent sensitivity against Staphylococcal infections
  - The most sensitive drugs are aminoglycosides group, specially Amikacin

Thank you