Use and misuse of medication

Przemysław Kardas MD PhD
Our timetable for today

1.1 Medication use and misuse
1.2 Medication use and misuse in acute conditions
1.3 Medication use and misuse in chronic conditions

1.1 Who is responsible for medication misuse in acute and chronic conditions
1.2 Common errors in medication
1.3 The role of OTC drugs

2.1 Patient compliance - general definition
2.2 The prevalence of patient compliance
2.3 How can I know whether the patient is adherent or not?

3.1 Factors influencing patient compliance
3.2 How to enhance patient compliance—students’ project
3.3 How to enhance patient compliance—presentation of projects and group discussion
Historical perspective

• **1928** Alexander Fleming observed antibacterial activity of *Penicillium notatum*

• **1941** first human successfully treated with penicillin

• **1945** Alexander Fleming, Howard Florey and Ernst Chain were awarded the Nobel Prize for Medicine
Caution! We may lose the miracle drugs of the 20th century!

Answer: "Think globally, act locally"
Reasons for medication misuse: human factor

Who is responsible for that?

Patient

Doctor

Pharmacist
Conditions for justified antibiotic use

1. Diagnosis = infection
2. Pathogen = bacteria
3. Appropriate antibiotic
4. Appropriate dosage and duration
5. Benefit >> harm
Antibiotic misuse

1. Diagnosis = infection
2. Pathogen = bacteria
3. Appropriate antibiotic
4. Appropriate dosage and duration
5. Benefit >> harm

Allergy!

Viruses: The common causes of colds and URTI are viruses but the rate of antibiotic prescription in URTI is 61 and 63%, respectively

Cantrell R et al., Clin Ther, 2002; 24(1):170-82.

Aminoglycosides!
Reasons for antibiotic misuse (1)

Otitis media

The Netherlands

- Antibiotics are **not** the first line therapy
- 31% patients given antibiotics
- 3% penicillin-resistant *S. pneumoniae* strains

The Rest of Europe & USA

- The leading cause for antibiotic treatment in children
- >90% patients given antibiotics
- 53% penicillin-resistant *S. pneumoniae* strains in France

References:

Appelman CLM *et al.*, Utrecht: Dutch College of Family Doctors, 1990
Reasons for antibiotic misuse (2)

**Patient**
- Don’t understand the nature of illness
- Expect to be treated
- Need to return to work
- Similar symptoms treated with antibiotics in the past

**Doctor**
- Patient satisfaction/pressure
- Time pressure
- Diagnostic uncertainty
- Lack of follow-up
Reasons for antibiotic misuse (3)

Human factor: OTC antibiotics

- **Sweden:**
  - 0.3% of patients claim to obtain their antibiotic without a prescription

- **Spain:**
  - only 66% of antibiotics found in the households were prescribed by the physicians
  - 65.9% of pharmacists report dispensing antibiotics without prescription!

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Antibiotic use in Europe

Antibiotic use and resistance in Europe

An average amount of antibiotic course prescribed by GP’s in Opole region, Poland, between 01.11.2005 and 30.04.2006

Average 14.48 courses/100 visit
Racjonal antibiotic therapy
Clinical presentation

Bacteria

Virus
Racjonal antibiotic therapy
Clinical presentation

Bacteria

Virus
# Pharyngitis – Centor’s criteria

<table>
<thead>
<tr>
<th>Symptom</th>
<th>points</th>
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<tr>
<td>Fever &gt;38°C</td>
<td>+1</td>
</tr>
<tr>
<td>Lack of cough</td>
<td>+1</td>
</tr>
<tr>
<td>Cervical lymphadenopathy</td>
<td>+1</td>
</tr>
<tr>
<td>Swallowed tonsils, tonsillar exudates</td>
<td>+1</td>
</tr>
<tr>
<td>Age &lt; 15 y</td>
<td>+1</td>
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<tr>
<td>Age &gt; 45 y</td>
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<tr>
<td>-1 - 0</td>
<td>2-3%</td>
<td>No antibiotic treatment</td>
</tr>
<tr>
<td>1</td>
<td>4-6%</td>
<td>No antibiotic treatment</td>
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<tr>
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<td>10-12%</td>
<td>Test + treatment for (+)</td>
</tr>
<tr>
<td>3</td>
<td>27-28%</td>
<td>Test + treatment for (+)</td>
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<tr>
<td>4-5</td>
<td>38-63%</td>
<td>Antibiotic treatment</td>
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Pharyngitis – point-of-care tests

- ACON On-Call™ Strep A Rapis Test Strip
- ScreenMed Strep A Test
- BD Link2™ Strep A
How could he know?

keep watch also on the faults of the patients, which often make them lie about the taking of things prescribed.

Hippocrates

V - IV century B.C.
Stages of the ideal therapeutic process

- Examination
- Diagnosis
- Prescription
- Completion

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Definitions of patient compliance

The extend to which a person’s behaviour
(in terms of taken medications, following
diets, or executing life-style changes)
coincides with medical or health advice

Haynes, Compliance in healthcare, 1979
Definitions of patient compliance

the extent to which the time history of drug administration corresponds to the prescribed regimen

Non-compliance

- any deviation by a patient from a doctor’s instruction

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Non-compliance

- **diet**
- **exercise**
- **medication**
- **lifestyle**
What happens with your prescription?
Causes of non-compliance with antibiotics (1)

- lack of belief that antibiotic is necessary
- cost of antibiotic
- formulation
- rapid improvement of symptoms

63% (UK)-96% (Spain) of patients who stop treatment prematurely did this because they felt better!

- forgetfulness
- frequent dosing
- side effects

Causes of non-compliance with antibiotics (2)

Patients’ beliefs:

- *lack of belief that antibiotic is necessary*
- *interactions with drugs*
- *interactions with drugs alcohol*
- *harm for immune system*

Patients’ beliefs of Taiwan residents:

- *it’s harmful to follow physicians’ directions when taking antibiotics* - 40.8%
- *taking less antibiotics then prescribed is more healthy* - 92.6%

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Patterns of non-compliance with antibiotics

- Failure to buy/obtain medicines
- Failure to start therapy
- Delay in starting therapy
- Unintentional omission of single doses
- Conscious omission of single doses
- Regular change in frequency of doses
- Regular changes in time intervals between doses
- Periodic dose increase
- Prematurely stopping the therapy

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Persistence Rates by Major Therapeutic Category

- Anti-cholesterol
- Anti-diabetic
- CV-Agent
- Anti-depressant

% of Patients Remaining on Therapy

Compliance rates drop with time

AARP National Survey, March 2002
Patterns of non-compliance
Patterns of non-compliance
Non-compliance with antibiotics: prematurely stopping the treatment

Patients claiming to have finished the course (%)
Patterns of noncompliance
Consequences of non-compliance with medication

- patient health status
- need for additional consultations
- need for extra drugs
- hospital admissions
- costs ($ 100 billion/year in USA )
Effect of compliance on UTI recurrence rate in children

- Compliant - 3,0 episodes/year
- Partially compliant - 4,8 episodes/year
- Non-compliant - 7,2 episodes/year

Consequences of non-compliance with antibiotics

Undercompliance:

- recurrent disease
- development of complications
- emergence of antibiotic-resistant strains
### Consequences of non-compliance with antibiotics

<table>
<thead>
<tr>
<th>Compliance</th>
<th>Penicillin-resistant pneumococci</th>
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<tbody>
<tr>
<td>France</td>
<td>Low</td>
</tr>
<tr>
<td>Germany</td>
<td>High</td>
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*Pradier et al., 1997*
Consequences of non-compliance with antibiotics

Overcompliance:

- adverse effects
- superinfections
- costs
Non-compliance with antibiotics in outpatient settings: a meta-analysis

Overall non-compliance = 37.8%

Mean use of leftovers = 28.6%

How many children are compliant with antibiotics?

Non-compliance in chronic conditions (e. g. HTA)

- Non-compilers: 5-10%
- Partial compilers: 30-40%
- Compilers: 50-60%

(P. Rudd et al., 1992)
Consequences of non-compliance

Unplanned pregnancies

errors with oral contraceptives:

• 3% of married women
• 6% of not married ones
• 34 - 55% of teenagers
Managing compliance

Physicians seldom use techniques effective in the improvement of patient compliance

Factors influencing compliance with antibiotics in RTIs

Low price of antibiotics

- but even free of charge antibiotics do not guarantee 100% compliance

- social insurance vs reduced cost
  the same % of compliant patients


- clinical trails!
Factors influencing compliance with antibiotics in RTIs

Short-term therapy

The nationwide study on compliance of German pediatric patients with oral antibiotic therapy

≤ 7 days > > 8+ days

Hoppe et al., Pediatr Infect Dis 1999; 18(12): 1085-91
Effect of duration of antibiotic therapy on patient compliance

- 3rd day: 44%
- 6th day: 29%
- 9th day: 18%

10 day penicillin treatment for streptococcal infections

Factors influencing compliance frequency of doses

Claxton et al., Clin Ther 2001; 23: 1296-310.
Factors influencing compliance with antibiotics

**frequency of doses**

increasing the number of daily doses by one (in the range 1-4)

increased the probability of a patient being non-compliant by 72%

Factors influencing compliance with antibiotics in RTIs

**frequency of doses**

- **od**: 97.6%
  - 2.4%
  - N=501
  - p<0.0001
  - OR=21

- **bd**: 64.9%
  - 35.1%

Effect of antibiotic formulation on patient compliance with antibiotic treatment for pneumonia in children.

% of patients taking medication by day 4th:
- Syrup: 82%
- Sachets: 71%
- Tablets: 55%

Factors influencing compliance with antibiotics in RTIs

Easy-to-use packaging

Over 10% of patients in geriatric ward had difficulties with opening at least one commonly used drug packaging

Predicting compliance

Physicians are unable to predict which patient will comply and which one will not.

Eraker et al., Ann Intern Med 1997; 1984:258-68.

Conclusion: everyone should be addressed!
Non-compliance - what can be done?

There is no single method for solving the problem of noncompliance....
Non-compliance
- what can be done?

... but it would be helpful to make the treatment
•“user-friendly”
•“intelligent”
What doctors can do?

Teach your patient simple skills on how to follow a dosing plan, and reinforce the message at every visit

Cramer J., Heart 2002; 88: 203-206
Nieprzestrzeganie zaleceń terapeutycznych - i co dalej?

lekarz może odstąpić od leczenia, jeśli pacjent nie stosuje się do zaleceń lekarza...

Interwencje sprzyjające przestrzeganiu zaleceń terapeutycznych: edukacja
Interwencje sprzyjające przestrzeganiu zaleceń: współudział i samokontrola

- aktywny współudział pacjenta w terapii
- nadzór i kontrola ze strony lekarza
Interwencje sprzyjające przestrzeganiu zaleceń terapeutycznych: przypomnienia

- pomoc rodziny i osób trzecich
- reminders
- powiązanie przyjmowania leków z innymi czynnościami
Zalecenia terapeutyczne – zawsze pisemnie
**Zalecenia terapeutyczne – zawsze pisemnie**

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**Uwagi**

- Lek
- Rano
- Południe
- Wieczór
- Uwagi