

Evaluation of antibiotic dosages in patients with a reduced kidney function

SBIMC- BVIKM
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La Hulpe

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Content

- ➔ **Background and objective**
- ➔ **Design study**
- ➔ **Discussion**
- ➔ **Conclusion**

Background and objective

- ➔ **Literature data shows that hospitalized patients with a reduced kidney function are frequently treated with inappropriate antibiotic dosages**
 - ➔ Overdosage ----- serious adverse reactions
 - ➔ Underdosage ---- failure of treatment ---- resistance development

- ➔ **Initiative by the local Antibiotic Policy Group to evaluate the local practice**

- ➔ **Protocol approval by local ethical committee**

Retrospective observational study: design

- **Inclusion criteria**
 - > 18 years
 - admission on internal medicine, abdominal surgery or nephrology (period April 2006 – March 2007)
 - estimated glomerular filtration rate (eGFR) < 60 mL/min/1,73m²
- **Exclusion criteria**
 - dialysis patients
 - kidney transplant patients
 - patients < 18 years

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➤ Formula for measuring kidney function

- eGFR with MDRD-formula (Modification of diet in renal disease)
 - serum creatinine, age, sex
- creatinin clearance with Cockcroft & Gault formula
 - serumcreatinine, age, sex and weight

➤ Datacollection

- trainee pharmacist under supervision of a hospital pharmacist and an infectiologist

Retrospective observational study: design

- ➔ **Evaluation of antibiotic dosage**
 - ➔ evaluation panel: infectiologist, intensive care physician, pharmacist
 - ➔ administered dosages in relation to the creatinine clearance
 - ➔ dose adaptations were based on the recommendations of “The Belgian edition of the Sanford Guide for Antimicrobial Therapy”
 - ➔ antibiotic dosages for which therapeutic monitoring is necessary were evaluated based on plasma concentrations

Results

| | |
|------------------------------------|--------------------|
| Number of treatments | 99 |
| Sex male/female | 46/53 |
| Number of treatments | |
| Nephrology | 27 |
| General medicine | 21 |
| Abdominal surgery | 51 |
| Mean age (SD) | 64,5 (15,3) |
| Number dosages administered | 1.364 |

Results

| Number administered dosages | Number correct dosages (%) | Number incorrect dosages (%) |
|------------------------------------|-----------------------------------|-------------------------------------|
| 1.364 | 1.068 (78,3) | 296 (21,7) |

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| <i>Number dosages without data (%)</i> | <i>Number dosages overdosed (%)</i> | <i>Number dosages underdosed (%)</i> |
|---|--|---|
| 39 (13,2) | 183 (61,8) | 74 (25) |

Discussion: Results of similar studies

| Number of inappropriate antibiotic dosages in renal failure patients | Reference |
|--|---|
| 86% | Cunha B et al. International Journal Antimicrobial Agents 1998;11:167-177 |
| 33% | Falconnier A et al. J Gen Intern Med 2001;16:369-375 |
| 36% | Evans R et al. The Annals of Pharmacotherapy 1999;33: 1026-1031 |
| 77% | Veen G et al. Pharmaceutisch Weekblad 2001;29:1048-54 |
| 25% | Arlicot N et al. Renal Failure 2007;29:1055-1058 |

Discussion: Instruments for optimising prescribing for patients with a reduced kidney function?

- ➔ Promoting guidelines (passive, active)

- ➔ Clinical Decision Support System (CDSS) linked to a Computerized Physician Order Entry (CPOE) (Evans R et al. The Annals of Pharmacotherapy 1999;33: 1026-1031)
 - ➔ Online alert
 - ➔ Alert by email or SMS

- ➔ Antibiotic Policy Groups
 - ➔ **Clinical pharmacists** (Olson L Can J Hosp Pharm 2005;58:20-5)

Discussion: Instruments for optimising prescribing in renal failure in the Ghent University hospitals?

➔ Improvements

- ➔ Alert is presented when physicians or clinical pharmacists are consulting the electronic laboratory results
 - ➔ The pop-up "Your patient has a possibly reduced kidney function. Take care when prescribing medication." appears when an algorithm found an eGFR below 60 ml/min/1,73m² for patients between 18 and 70 years.
- ➔ *Letter to al physicians*
- ➔ *Task for clinical pharmacist*

Conclusion

- ➔ **One fifth of the patients received an inappropriate antibiotic dosage according the kidney function.**
- ➔ **An electronic alert was installed to improve the awareness.**

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