Title:
The contribution of renal impairment to preventable medication related hospital admissions

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Background
Medication errors related to impaired renal function, such as lack of monitoring of renal function, ignoring or non-compliance with dosing guidelines, frequently occur in the inpatient setting, which can lead to severe adverse drug events. Whether clinically relevant errors occur as often within the outpatient setting is less well known. Therefore we analyzed the medication related hospital admissions from the HARM (Hospital Admissions Related to Medication)-study[1] to determine the extent to which renal impairment contributes to preventable hospital admissions due to medication errors.

Methods
For all included cases in the HARM-study creatinine levels were collected and creatinine clearance was estimated by using the Jelliffe-II formula[2]. These patients were divided into three groups based on the availability of creatinine levels: Group A, the home-monitored group, group B, the in-hospital-monitored group and group C, the non-monitored group. All HARM-cases were assessed on a causal relationship between renal function and the admission and if a medication error such as a drug-drug interaction, inappropriate dosing or a drug-disease interaction as described in the national guideline renal impairment[3,4] was present.

Results
Serum-creatinine before admission to hospital was available in 30.8% (227) of the 714 patients included in the HARM-study (group A). From 58.8% (420) of the patients, creatinine levels were available only on admission to hospital (group B). From 9.4% (67) of the patients renal function was not available (group C). The groups A, B and C did not differ with respect to general characteristics such as age, gender, morbidity or medication, but patients in group C had significantly less registered diseases.
After assessment 70 admissions (10%) were related to medication and to renal impairment (29 from group A, 41 from group B and none from group C). A dosing error was found in 46 patients (14 in group A and 32 in group B), a drug-drug interaction in 22 patients (13 in group A and 9 in group B) and a drug-disease interaction in 17 patients (10 in group A and 7 in group B).

Conclusions
Renal impairment and medication may lead to medication related hospital admissions. From these admissions in the hospital-monitored group B we conclude that monitoring renal function is relevant and can probably prevent admissions. Although the renal function in group A was monitored, relevant medication errors occur in this group, therefore we conclude that adjusting pharmacotherapy according to the renal function is relevant and may prevent hospital admissions.

References

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