

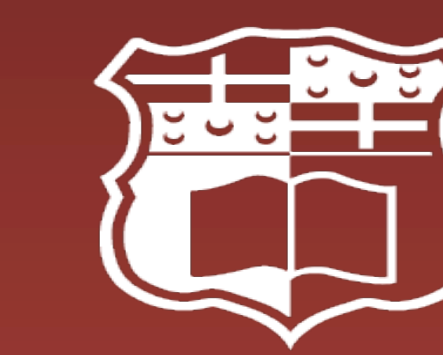
Drug dosing in patients with renal impairment

KM. ANTONIAK^{1,2} and J. VELLA SZIJJ¹

(1) Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta, Msida, Malta

(2) East Tallinn Central Hospital, Tallinn, Estonia

email: kairi.antoniak.17@um.edu.mt



L-Università ta' Malta
Faculty of
Medicine & Surgery

Department
of Pharmacy

Introduction

Inappropriate prescribing (IP) is common in patients with poor renal function in hospital and in outpatient settings. The extent of IP among patients with impaired renal function varies between countries and medical specialities¹. Clinical pharmacist interventions have shown positive impacts on clinical and economical outcomes in patients with renal impairment².

Aims

To assess prevalence of IP in medical wards in a 400-bed acute care hospital in Estonia and to identify the most common drug classes which are inappropriately prescribed.

Method

The retrospective descriptive study included patients 18 years and older who were suffering from renal impairment and who were admitted to medical wards between 1st January and 31st December 2018. Patients included in the study had to be admitted for more than 24 hours with documented estimated glomerular filtration rate (eGFR) less than 60 ml/min/1.73m² and had to receive at least one systemic medication. Patients were selected using stratified random sampling method. Data collection form was set up and validated by a multi-disciplinary expert panel and was used to collect data about demographics, medications and eGFR results from electronic health records. IP was assessed using eGFR according to Chronic Kidney Disease Epidemiology Collaboration equation, absolute glomerular filtration rate (absGFR) and estimated creatinine clearance (eCrCl) according to Cockcroft-Gault equation. Adjusted body weight for obese patients was used for eCrCl calculations. All required ethics approvals were sought and granted.

Results

Table 1. Patient demographics (N=230)

Characteristic	Value
Female, n (%)	144 (63)
Mean age, years	80 (47...99, IQR 13.5)
Average body mass index	29.0
Mean length of hospitalisation, days	6 (1...30, IQR 6)
Median medication per day	9 (1...26, IQR 6)
Charlson comorbidity index	6 (1...15, IQR 3)
Hypertension, n (%)	180 (78.3)
Heart failure, n (%)	107 (46.5)
Atrial fibrillation, n (%)	105 (45.7)
Diabetes, n (%)	63 (27.4)
Chronic kidney disease, n (%)	71 (30.9)
Acute kidney injury, n (%)	56 (24.3)
Patients with ≥1 inappropriate prescription, n (%)	139 (60.4)
Patients with ≥3 inappropriate prescription, n (%) (n=139)	61 (43.9)
Patients with ≥1 contraindicated prescription, n (%)	19 (8.3)

Table 2. Inappropriate prescribing (N=1729)

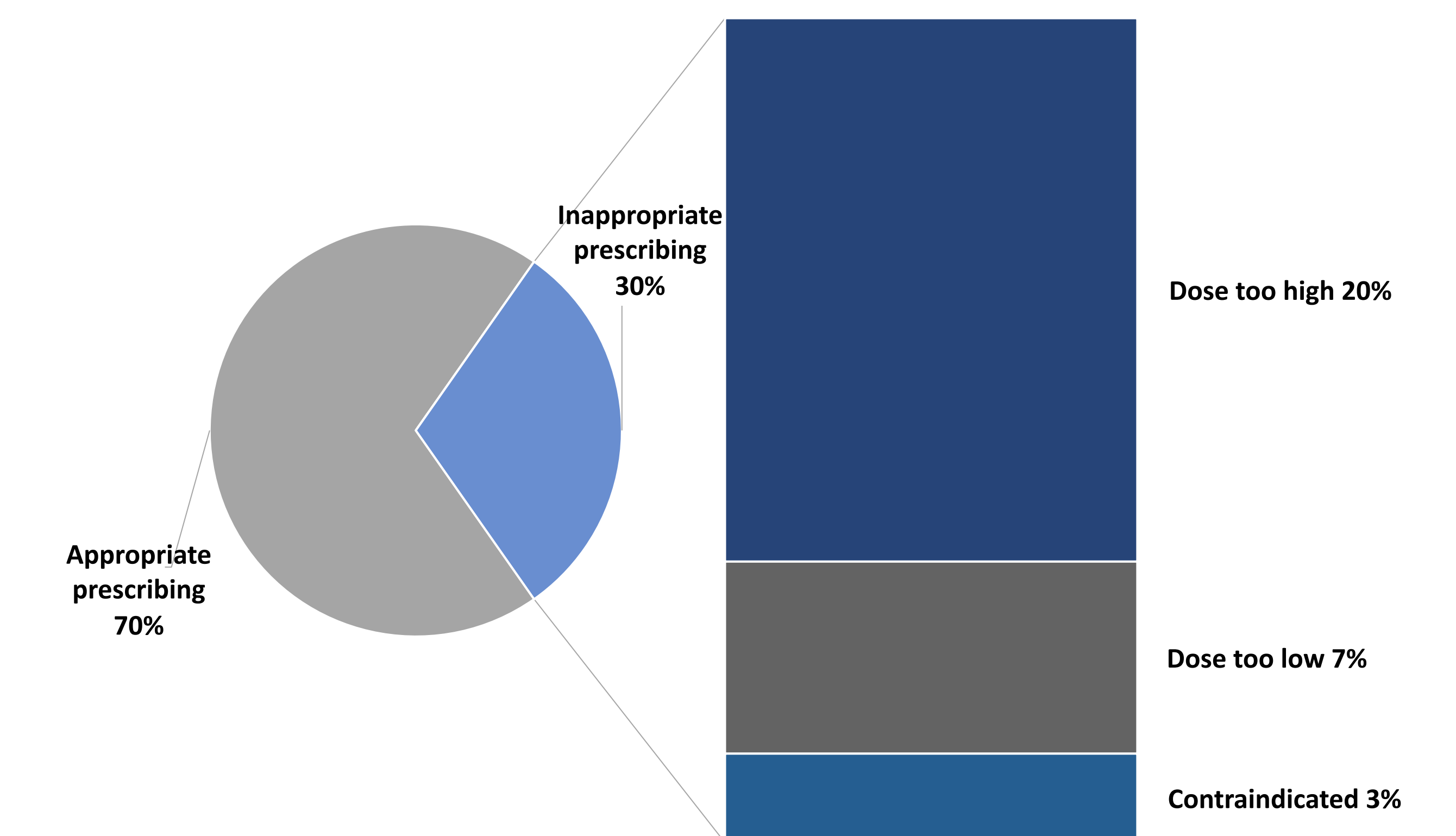
Characteristic	Number of prescriptions (for absGFR and eCrCl)	According to eGFR*, % (n)	According to absGFR*, % (n)	According to eCrCl*, % (n)
Inappropriate prescribing	1729 (1263)	30.5 (528)	28.3 (357)	28.7 (363)
Contraindicated prescriptions	1729 (1263)	3.3 (57)	3.1 (39)	2.4 (30)

*Percentage calculated from the total number of prescriptions available for absGFR and eCrCl.

The most common medication classes which were inappropriately prescribed according to eGFR were cardiovascular agents (58.4%, 307 of 528 prescriptions) including anticoagulants (i.e. enoxaparin and DOACs) and anti-infective agents (27.3%, 144 of 528 prescriptions).

IQR – interquartile range; eGFR – estimated glomerular filtration rate; absGFR – absolute glomerular filtration rate; eCrCl – estimated creatinine clearance; DOACs – direct oral anticoagulants

Figure 1. Inappropriate prescribing according to eGFR (N=1729)



Conclusion

Results of the study show that dosage adjustment of medication in renal impairment is still an ongoing problem that needs to be addressed. Choice of renal function estimate did not significantly affect the overall prevalence of IP among study population. This study will support the development of renal dosage adjustment guideline for the hospital and stress the need for a clinical pharmacist presence in the multidisciplinary team caring for patients with renal impairment.

References

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2. Al Raiisi F, Stewart D, Fernandez-Llimos F, Salgado TM, Mohamed MF, Cunningham S. Clinical pharmacy practice in the care of Chronic Kidney Disease patients: a systematic review. *Int J Clin Pharm.* 2019;41:630-66.

Contact: Kairi Marlen Antoniak, kairi.antoniak.17@um.edu.mt

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