Predictors of inappropriate prescribing in patients with renal impairment

KM. ANTONIAK[1,2] and J. VELLA SZIJJ[1]

(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. Factors contributing to IP include age, comorbidities and polypharmacotherapy[1,2]. IP in patients with decreased renal function can increase risk of adverse drug reactions, mortality and can lead to longer hospitalisation[3]

Aims

To identify risk factors leading to inappropriate prescribing in medical and surgical patients with decreased renal function in a 400-bed acute care hospital in Estonia.

Method

The retrospective descriptive study included patients 18 years and older who were suffering from renal impairment and who were admitted to hospital 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/1.73m^2 according to Chronic Kidney Disease Epidemiology Collaboration equation and had to receive at least one systemic medication. Patients were selected using stratified random sampling. Data collection form was developed 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 hospital guideline for renal dosage adjustments. Predictors for IP were analysed using univariable and multivariable logistic regression models. All required ethics approvals were granted.

Results

Table 1. Patient demographics (N=399)

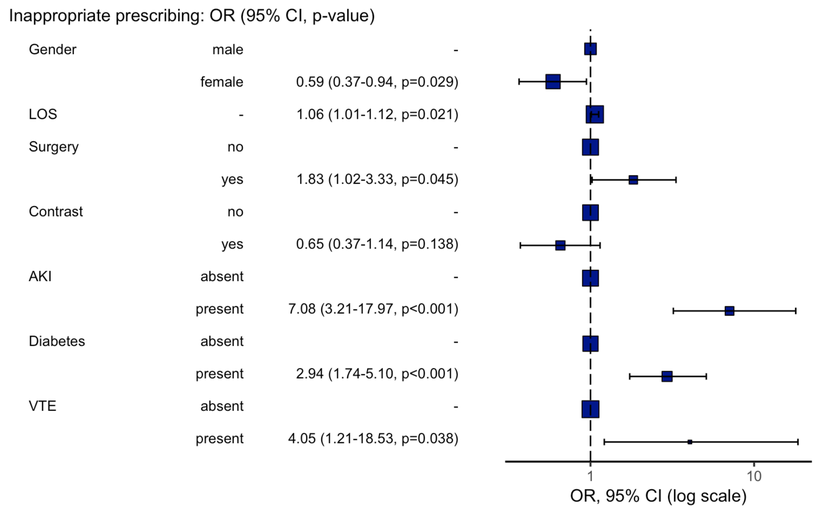
Characteristic	Value
Female, n (%)	250 (63)
Mean age, years	79 (42…99, IQR 14)
Mean length of hospitalisation, days	6 (1…31, IQR 6)
Median medication per day	8 (1…26, IQR 6)
Surgery performed during hospitalisation, n (%)	66 (16.5)
Administration of contrast media, n (%)	84 (21.1)
Charlson comorbidity index	5 (1…15, IQR 3)
Hypertension, n (%)	300 (75.2)
Heart failure, n (%)	148 (37.1)
Diabetes, n (%)	105 (26.3)
Venous thromboemolism, n (%)	20 (5.0)
Chronic kidney disease, n (%)	94 (23.6)
Acute kidney injury, n (%)	72 (18.0)

Table 2. Independent predictors of inappropriate prescribing according to univariable logistic regression model (N=399)

Comorbidity	OR (95% CI)
Charlson comorbidity index	1.17 (1.06…1.30)
Hypertension	1.69 (1.07…2.67)
Heart failure	1.85 (1.21…2.84)
Atrial fibrillation	1.61 (1.05…2.47)

Enoxaparin was the most inappropriately prescribed medication and main contributor to higher odds of IP among patients undergoing surgery, diagnosed witk AKI or VTE.

Figure 1. Predictors of inappropriate prescribing in patients with renal impairment according to multivariable logistic regression model (N=399)



IQR – interquartile range; OR – odds ratio; CI – confidence interval; LOS – length of hospital stay; Contrast – contrast media administration during hospitalization; AKI – acute kidney injury; VTE – venous thromboembolism

Conclusion

Results of the study show that comorbidities and longer hospitalisation and surgery performed during hospital stay were predictors of IP in elderly patients with decreased renal function. Being aware of possible predictors of IP could help better identify patients at increased risk of IP and improve patient outcomes. Results of the study could be used to set up alert system within electronic health records and electronic prescribing system.

References

1. Khanal A, Peterson GM, Castelino RL, Jose MD. Potentially Inappropriate Prescribing of Renally Cleared Drugs in Elderly Patients in Community and Aged Care Settings. Drugs Aging. 2015;32:391-400.
2. Saleem A, Masood I. Pattern and Predictors of Medication Dosing Errors in Chronic Kidney Disease Patients in Pakistan: A Single Center Retrospective Analysis. PloS ONE. 2016;11(7):e0158677.
3. Tesfaye WH, Castelino RL, Wimmer BC, Zaidi, ST. Inappropriate prescribing in chronic kidney disease: A systematic review of prevalence, associated clinical outcomes and impact of interventions. Int J Clin Pract. 2017;71:e12960-3.

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

Acknowledgments: Julius Juurmaa, MD, East Tallinn Central Hospital