Medication errors in general practice

Types of errors in oral anticoagulation and antihypertensive treatment

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Overview

- explorative study, retrospective design
- 26 GP Practices
- period of study time: 2005-2006
- overall 350 patients in 3 different indications
  - Multimedication (separate arm of study)
  - Antihypertensive therapy (AHT)
  - Oral anticoagulation (OAC)
- no conflict of interest
  - Supported by German Ministry of Education and Research (BMBF)

What is an medication error?

"A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer….

(National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP))

Why antihypertensive therapy?

- common diagnosis and therapy
- existing guidelines
- probable increased risk of interactions due to use of multiple drugs

Why oral anticoagulation?

- small therapeutic range, regular check of INR
- evidence for increased bleeding risk due to interactions [1]
- approximately 8 % of reported errors on the German GP error reporting system www.jeder-fehler-zaehlt.de are associated with oral anticoagulation
- antithrombotic agents took with 8% a second rank within inadequate medication

[1] *Penning-van Beest, Erkens et al. 2005*

[2] ***P**rimary **C**are **I**nternational **S**tudy on **M**edical **E**rrors, 2004*

Classification of errors – according to James Reason

a **planned** action does not achieve its **goal**

- **mistake**, the action is based on a **wrong plan,** either by using a wrong rule (**rule-based mistake**) or because of wrong or lacking knowledge (**knowledge-based mistake**)

or

- **execution error**, the action is **not performed as planned**, either by lacking attention (**slip**) or memory (**lapse**).

(Reason J. *Qual Health Care 1995; 4: 80-89.)*

Classification of errors according to James Reason – Examples taken from the study

- **mistake (wrong plan)**
  - rule-based mistakes, for example GPs comment on a delayed INR-check: „*I rather watch out for symptoms of bleeding instead of focusing too much on measurement of the INR.*“
  - knowledge-based mistakes, e.g. interaction between Phenprocoumon and Roxythromycin was not known → result: delayed control of INR which was finally 3,6.
- **execution error (not performed as planned)**
  - slips, e.g. intramuscular injection of Diclofenac despite oral anticoagulation (GPs comment: „*This has been overlooked.*“)
  - lapses, e.g. prescription of Acetyldigoxin and diuretics without any control of electrolytes (GPs comment: „*I‘ve forgot it.*“)
- **violation**
  - e.g. overdosing of a drug → comment: *„I do not always respect the dosing instruction“.*

Method

- **Origin of data**
  - chart review (period: 1 year)
  - structured patient interviews
- **Analysis**
  - systematic usage of **indicators** (derived from international guidelines on oral anticoagulation (35 indicators) and antihypertensive therapy (30 indicators))
  - systematic query of **contraindications** and **interactions** using pharmacological databases and verification of relevance of findings with expert (clinical pharmacologist)
- **Evaluation interview with GP**
  - interview concerning practice routines, semistructured discussion of the findings with the GP (review of deviation from indicators), classification based on causal relation

Results I: background + indicators

- analysis of data of **99 (OAC)** resp. **147** patients **(AHT)**
- **14** out of 35 indicators concerning oral anticoagulation and **13** out of 30 indicators concerning antihypertensive therapy were applicable (as measured by quality of documentation)
- **2,3** deviations/patient (all together 232 deviations) in oral anticoagulation and **1,8** deviations/patient (all together 261 deviations) in antihypertensive treatment

Results II: types of indicators

- **oral anticoagulation** („top five“):
  - lack of warning note about OAC (red flag): **62%**
  - patient not informed about risks of OAC**: 35%**
  - INR-range not documented: **21%**
  - INR-deviation >0,5 without control: **16%**
  - indication not documented: **12 %**

Results II: types of indicators

- antihypertensive therapy („top five“):
  - patient not informed about risks of AHT**: 50%**
  - no potassium control while using diuretics: **44%**
  - hypertensive deviation without close control: **19%**
  - no documented blood pressure within 6 months: **14%**
  - no potassium or creatinine control after starting ACE-inhibitors: **6%**

Results III: interactions

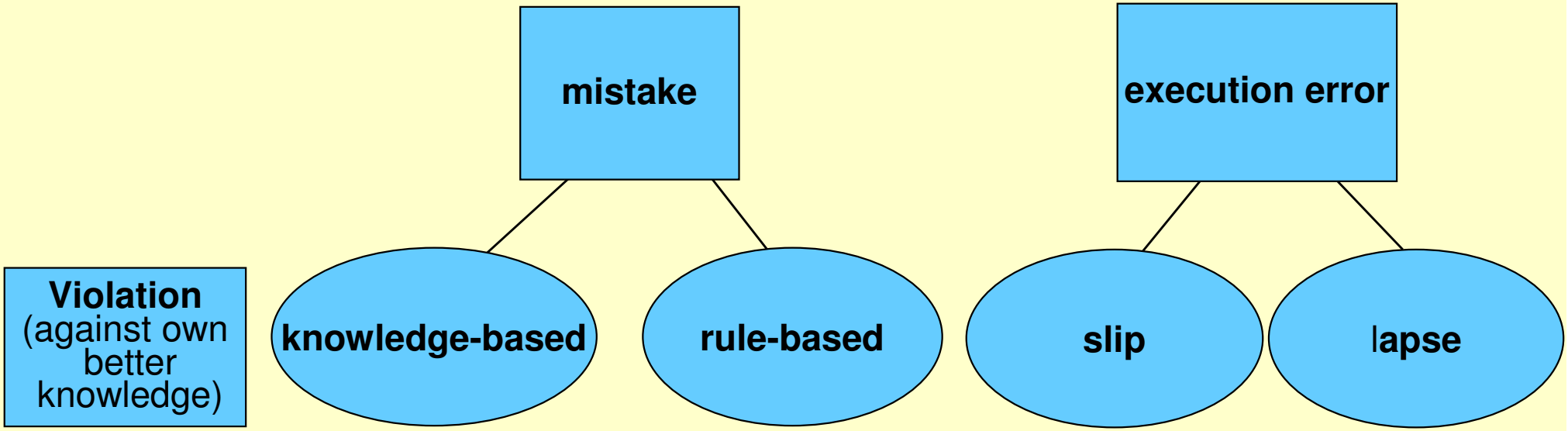
- average of drugs per patient (permanent medication following data from patient interview)
  - Ø 5,4 per patient in OAC
  - Ø 6,9 per patient in AHT
- medical errors in relation to number of drugs used
  - below average: 1,9 errors/patient in OAC, 1,6 errors/patient in AHT
  - above average: 2,7 errors/patient in OAC, 1,9 errors/patient in AHT
- major risk of interaction
  - in 22% of OAC patients (14 of 31 concerning Phenprocoumon)
  - in 17 % of AHT patients

Results IV: age

- average age
  - Ø 70,7 years (OAC)
  - Ø 69,5 years (AHT)

- medical errors in different age groups
  - below average: 2,1 errors/patient in OAC, 1,4 errors/patient in AHT
  - above average: 2,4 errors/patient in OAC, 1,9 errors/patient in AHT

Results V: types of errors OAC



additional classification:

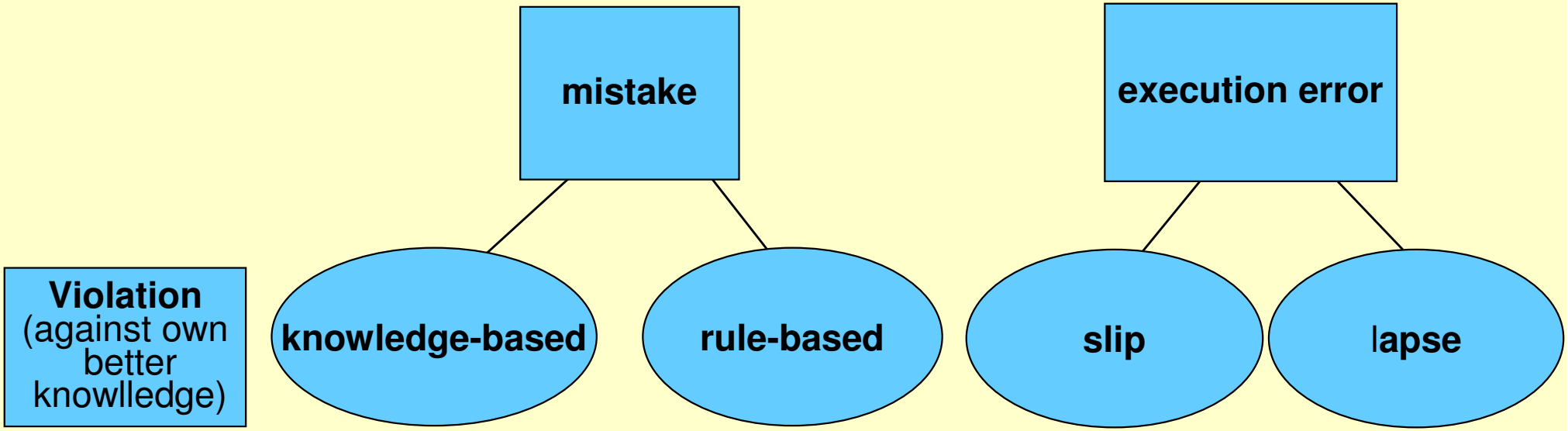
-other unsafe actions (lack of norm): 3,5 %

-contradictory statements (patient/GP) : 7,5 %

-not classifiable: 15 %

n=226 in 99 patients

Results V: types of errors AHT



Violation	knowledge-based	rule-based	slip	lapse
8,5 %	1,9 %	32,2 %	8,1%	18,0 %
3,1 %	5,8 %	41,6 %	19,5 %	3,9 %

additional classification:

-other unsafe actions (lack of norm): 13,0%

-contradictory statements (patient/GP) : 5,8 %

-not classifiable: 13,0 %

n=261 in 147 patients Red numbers: comparison to Oral AntiCoagulation

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Conclusions I

- **Willingness**
  - of GPs and patients to participate in research of medical errors
- **Adequate method**
  - systematic search for errors by using process indicators
- **Safety gaps**
  - deficient documentation
  - deficient monitoring

- **Difficulties**
  - definition and differentiation of errors
  - classification (because of insufficient documentation and lack of standardization of processes)

Conclusions II

- **Focus for avoiding errors and future investigations**
  - following the types of indicators (e.g. „top five“)
  - following the classification based on causes (J. Reason)
  - focus on elderly patients with multimedication
- **Avoid errors**
  - slips / lapses
    - e.g. by using tools in routine work, e.g. check lists, computer-based tools for prescription and monitoring
  - rule-based errors
    - e.g. implementing practice guidelines
  - in elderly patients using numerous drugs
    - e.g. list of drugs to avoid resp. to use with caution (e.g. „Beers“ list)