Drug-related problems in a cardiology department – identifying trends

**Background**
In recent years periodic medication reviews have been performed by a clinical pharmacist at four cardiology wards at Aarhus University Hospital, Skejby. Since November 2010 identified drug-related problems (DRPs) have been detected and classified using the Danish DRP database. In the database, the identified DRPs are categorized and grouped according to ATC code* and type of drug-related problem. Subsequent extraction of various reports can provide useful information of the trends of the DRPs.

**Purpose**
The aim of this study is to identify trends in DRPs at the cardiology department at Aarhus University Hospital, Skejby. Secondly we wish to demonstrate that the DRP-database is a useful tool in analysing data.

**Methods**
DRPs identified by the pharmacist over a two year period were analysed by using the reports in the DRP-database. 846 medication reviews were included in the analysis and a total of 563 DRPs identified.

**Conclusion**
The Danish DRP database has been used to analyse and identify trends in DRPs at the cardiology department.

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*Anatomical Therapeutic Chemical (ATC) Classification System

- A: Alimentary tract and metabolism
- B: Blood and blood forming organs
- C: Cardiovascular system
- D: Dermatologicals
- E: Endocrine system
- F: Eye
- G: Genito-urinary system, sex hormones
- H: Human immunodeficiency virus/retrovirus
- J: Antineoplastics, immunomodulators
- K: Respiratory system
- L: Antineoplastics, immunomodulators
- M: Musculo-skeletal system
- N: Nervous system
- P: Antiparasitics, insecticides, repellents
- R: Respiratory system
- S: Skin
- T: Tobacco
- V: Various
- Z: Ophthalmic preparations

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**Results**

**Classification of identified drug-related problems**

<table>
<thead>
<tr>
<th>ATC Code</th>
<th>Duration of therapy</th>
<th>Duplication</th>
<th>Deviation from recommendation</th>
<th>Dosage form</th>
<th>Electronic medication chart</th>
<th>Drug choice</th>
<th>Adverse effects</th>
<th>Interactions</th>
<th>Time/schedule</th>
<th>Additive therapy</th>
<th>Dose</th>
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**Identified drug-related problems distributed by ATC codes**

**Identified DRPs related to "Dose" Distributed by ATC codes**

- A (other than A02/A12) 20%
- B 15%
- C 26%
- D 87%
- E 26%
- N 19%
- A 17%
- B 10%
- M
- J

**Identified DRPs related to "Additive therapy" Distributed by ATC codes**

- A 12 (Minerals)
- B 87%
- C 22%
- D 28%
- E 28%
- N 24%
- M
- J

**Identified DRPs related to "Time/schedule" Distributed by ATC codes**

- A 12 (Minerals)
- B 87%
- C 22%
- D 28%
- E 28%
- N 24%
- M
- J

**Identified DRPs related to "Interactions" Distributed by ATC codes**

- A 12 (Minerals)
- B 87%
- C 22%
- D 28%
- E 28%
- N 24%
- M
- J

**Identified DRPs related to "DAPT with aspirin and e.g. ticagrelor is part of the standard treatment in acute coronary syndrome. Aspirin is associated with increased risk of bleeding.

- PPI prophylaxis in patients with high risk of GI-bleeding

- Drug therapy issue

- Dual antplatelet therapy (DAPT) with aspirin and e.g. ticagrelor is part of the standard treatment in acute coronary syndrome. Aspirin is associated with increased risk of bleeding.

- Drug therapy issue

- Proton Pump Inhibitors (PPI) are involved in 28% of DRPs related to "Additive therapy".

- Drug therapy issue

- The antiarrhythmic agent amiodarone is involved in 33% of DRPs related to "Time/schedule".

- Drug therapy issue

- To prevent development of nitrate tolerance and clinical rebound Isosorbide mononitrate sustained-release form must be given as one single daily dose (e.g. Imdur).

- Drug therapy issue

- The antianginal agent isosorbide mononitrate is involved in 33% of DRPs related to "Time/schedule".

- Drug therapy issue

- To prevent development of nitrate tolerance and clinical rebound Isosorbide mononitrate sustained-release form must be given as one single daily dose (e.g. Imdur).

- Drug therapy issue

- The antiarrhythmic agent amiodarone is involved in 33% of all the identified interactions.

- Concurrent drug therapy issues

- Drugs metabolized by CYP enzymes

- Amiodarone is a potent inhibitor of CYP enzymes and transport proteins, which may lead to increased serum concentrations/toxicity of a number of medications (e.g. simvastatin, digoxin, warfarin).

- Drugs with QT prolongation potential

- Coadministration of other drugs which may prolong QT interval needs special attention because of a possible additive effect and the risk of causing ventricular arrhythmias, especially torsades de pointes (e.g. certain antipsychotic drugs).

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**Conclusion**
The Danish DRP database has been used to analyse and identify trends in DRPs at the cardiology department.