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Identification of incorrect dosing of direct oral anticoagulants: an important intervention to improve patient safety

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Background and importance

Incorrect dosing of direct oral anticoagulants (DOACs) potentially increases the risk of bleeding or thromboembolic events. For **guideline-conform dosing**[1] indication, age, body weight, renal function, drug interactions and risk of bleeding have to be considered. Therefore, correct dosing can be **challenging** in clinical practice (see also Fig. 1).

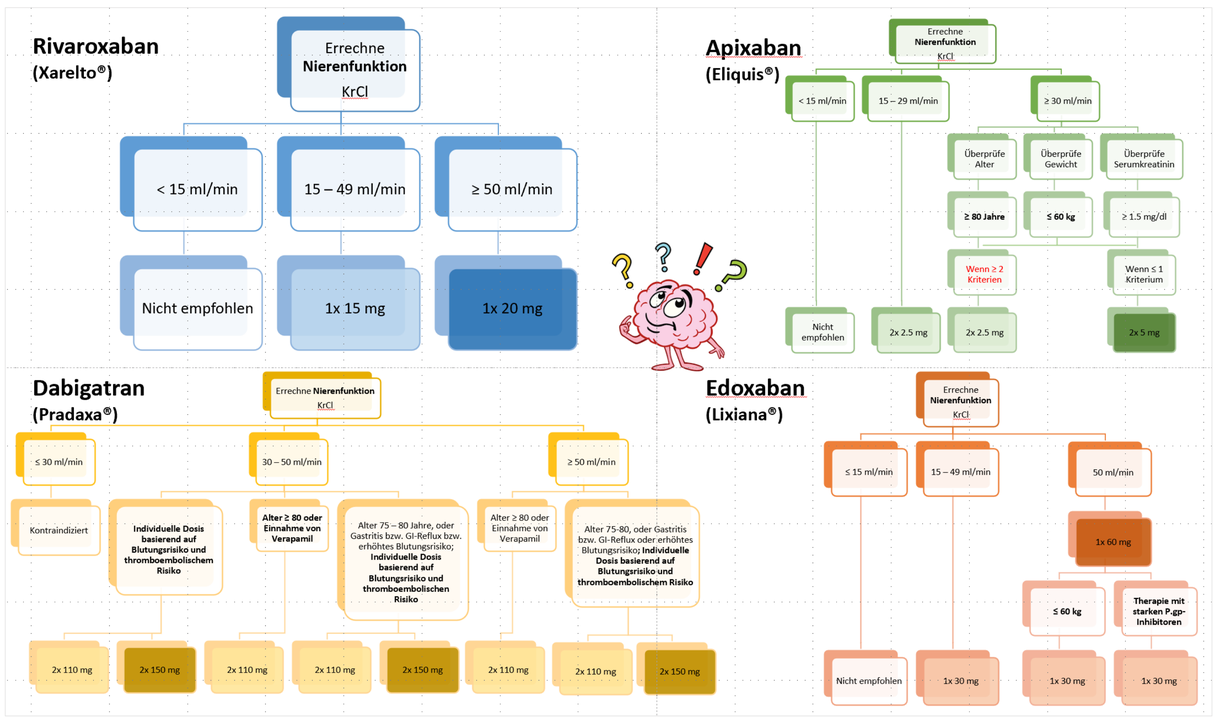

Figure 1: Flow chart illustrating corrct dosing according to SPC criteria for atrial fibrillation (© Nagele)

Aim and objectives

- Quantify DOAC **dosing errors**
- Identify **barriers** to correct dosing
- Assess potential **reasons** for dosing errors
- Investigate the **acceptance rate** of pharmaceutical interventions addressing dosing errors

Figure 2: CP promotes antithrombotic stewardship on ward round

Materials and methods

For **six months** (April - September 2021) all DOAC prescriptions of clinical pharmacists' (CP) reviewed patients were prospectively collected and assessed for dosing errors. If necessary, corrections were recommended to prescribers (see also Fig. 2). Doses were considered correct, if they were according to SPC criteria. **17 CPs** performed **medication reviews**. A total of 813 beds on 44 different wards (including surgical and internal medicine departments) were covered by CPs, which equals 47% of the tertiary care hospital.

Results

Dosing checks were performed in **811 patients** (44.5% women, median age 78 years, 41.4% eGFR(MDRD) < 60 ml/min/1.73 m^2). The most common DOAC indication was atrial fibrillation (76.2%). A total of **188 incorrect doses** (23.2%) were identified (see also Fig. 3). A significant relation was found between apixaban 2 x 2.5 mg and 2 x 5 mg ($p < 0.001$) as well as dabigatran 2 x 150 mg ($p = 0.045$) and incorrect dosing. A **risk factor** significantly related with incorrect dosing was age above 80 years ($p = 0.008$). **47.3%** of dosing errors were **corrected following a pharmaceutical intervention**. A common reason for incorrect dosing was "unstable renal function".

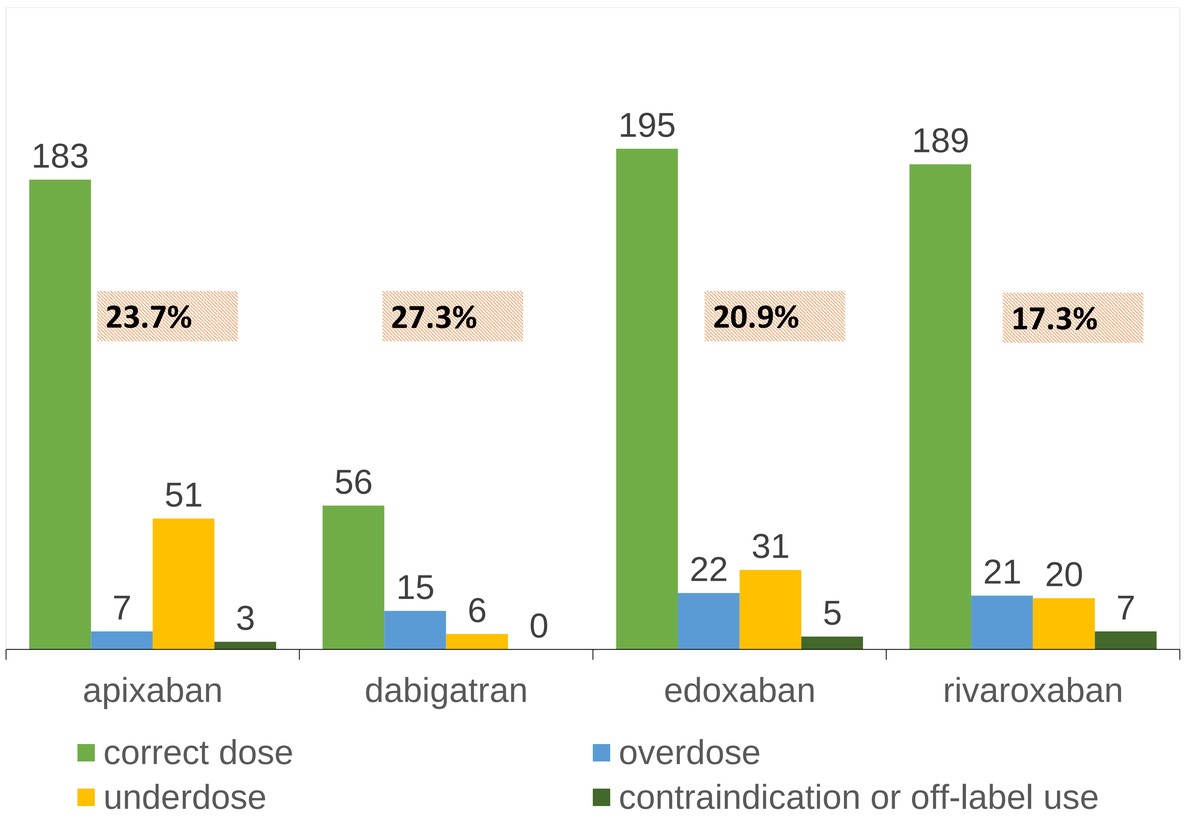

Figure 3: Absolute frequency and percentage of incorrect DOAC doses (orange shaded)

Conclusion and relevance

This study showed that DOAC dosing errors are frequent and pharmaceutical interventions can contribute to a **reduction of these errors**. Special caution is needed in elderly patients and renal impairment. Measures to increase acceptance rate need to be further investigated.

Reference: [1] Steffel J, Collins R, Antz M et al (2021) Europace 23 (10):1617-18.