Implementation and outcome of an electronic tool for detection of paracetamol overdose in a tertiary care hospital

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Abstract

Background: Paracetamol is a widely used analgesic and antipyretic drug in hospitals. The development and implementation of an electronic tool with algorithm-based alerts (e-agent) in a clinical information system could reduce the risk of overdose. Objective In this study, the performance of such an e-agent developed to detect paracetamol overdosing was analyzed. Setting Swiss tertiary care hospital.

Method: All patients ≥ 18 years old who had documented paracetamol administration in the used clinical information system during 2017 were retrospectively screened for an absolute and relative overdosing of paracetamol (> 4 g and > 60 mg/kg/24 h, respectively). This was compared with the patients for which the e-agent had, during the same period, prospectively made an alert for absolute or relative overdosing or for a dosing interval < 4 h (potentially leading to an absolute overdose).

Main outcome measure: E-agent performance defined as detection rate.

Results: Of the 13,196 adult patients who received at least one dose of paracetamol, 2292 were exposed at least once to > 4 g/day (17.4%), 39 of these (0.3% of total) were given > 5 g paracetamol. None received more than 6 g. The e-agent detected 87.2% of cases with doses > 5 g. In most cases (87.9%), the cause of the absolute overdose was a switch from intravenous to oral paracetamol, resulting in an absolute overdose the day of the change. The maximal daily dose of 60 mg/kg was exceeded in 30.1% of patients weighing < 50 kg, as well as in 42.3% of patients weighing < 60 kg. The e-agent detected 73.4% and 75.5% of those cases. Multiple absolute overdoses were found in 204 patients. The e-agent detected 72.7% of those. 90 multiple overdoses occurred during the same hospital stay and 11 on consecutive days.

Conclusion: Paracetamol overdose is a common medication error in hospitalized patients, which may occur due to process failures such as wrong timing when changing administration route or when factors like comedication and low body weight are ignored. The e-agent detects cases of paracetamol overdose, and therefore, can help prevent this kind of medication error in the clinical setting.

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