

Characteristics of Adverse Drug Reactions (ADR) to N-Acetylcysteine for Acetaminophen Overdose in a Tertiary Institution in Singapore

Introduction



Acetaminophen is the most common pharmaceutical medication involved in acute poisonings in Singapore and worldwide. While N-acetylcysteine has been proven to be an effective antidote for the management of acetaminophen overdose, N-acetylcysteine is associated with a high risk of ADRs and anaphylactoid reactions.

Methodology



A retrospective review of acetaminophen poisoning cases presenting to Singapore General Hospital, a tertiary institution, from January 2018 to September 2021 was conducted. Cases were identified by retrieving electronic medical records of all patients who had N-acetylcysteine administered and serum acetaminophen levels performed during the same admission during this time period. This excluded patients started on N-acetylcysteine for other indications, e.g. prophylaxis for contrast-induced nephropathy. Electronic medical records were subsequently reviewed to retrieve demographic data and case presentation details.

Results



A total of 124 cases of acetaminophen overdose necessitating treatment with N-acetylcysteine were identified. All patients were commenced on the traditional 20-21 hour 3-bag dosing regimen. 24 patients (19.4%) developed adverse reactions to N-acetylcysteine. ADRs developed at a mean time lag of 71.0 minutes from the start of administration. Reactions occurred mostly during administration of the loading dose (54.2%; $n=13$).

All 24 patients had skin manifestations (flushing, pruritus or urticaria). Three patients (2.4% of all cases) presented with respiratory ADRs (breathlessness and cough, $n=1$; breathlessness, $n=1$; rhonchi, $n=1$). Only two cases (1.6% of all cases) had severe ADRs causing cardiorespiratory compromise (chest tightness and wheezing necessitating nebulized salbutamol and intramuscular adrenaline, $n=1$; hypotension necessitating parenteral corticosteroids and intravenous fluids but not adrenaline, $n=1$). None required mechanical ventilation or admission to intensive care.

Conclusion



Although N-acetylcysteine is an effective antidote for acetaminophen overdose, the high incidence of ADRs and anaphylactoid reactions associated with the traditional three-bag regimen warrant consideration for the adoption of other dosing regimens with superior side effect profiles instead.