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An Evaluation of Potentially Preventable Theophylline-Related Deaths

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INTRODUCTION: Theophylline is a derivative of xanthine which action pharmacologically as adenosine antagonist. Overdosage of theophylline could be mortal. There are different management decisions that may have prevented fatal outcomes.

OBJECTIVE: This study propose is to review theophylline-related death cases to provide preventable judgment and improve future care.

METHODS: This is a retrospective cross-sectional study include theophylline-related deaths reported to Ramathibodi Poison Center (RPC) during January 2008 to June 2019. Cases were independently reviewed by 2 medical toxicology fellows-in-training. Preventability was graded by using a Likert scale of 1 (definitely non-preventable) to 6 (definitely preventable). Cases score 4 to 6 were deemed to be preventable. In preventable cases, improvement issues were described (consultation, transfer, treatment and monitoring). Inter-rater agreement was determined by weighted kappa analysis.

RESULTS: There were 12 deaths due to theophylline overdose. Ten deaths were suicidal ingestion. Eight deaths ingested theophylline sustained-release formulation. Four deaths ingested theophylline tablet but did not report the formulation. Ten (83.33%) deaths were defined to be preventable by both fellows. There were 75% agreement between rater with kappa coefficient 0.20 for preventability grading and 72.22% agreement between rater with kappa coefficient 0.43 for improvement issues. The ways to improve outcome involved decision were early consultation (2 of 10 deaths, 20%) and early transfer to higher level hospital (2 deaths, 20%), monitoring (5 deaths, 50%) and treatment such as hemodialysis (8 deaths, 80%), prescribe beta adrenergic antagonist (6 deaths, 60%) and gastrointestinal decontamination (4 deaths, 33.33%).

DISCUSSION: Death from theophylline overdose may be preventable. Some specific management may improve opportunities outcome.