Treatment and outcome of acute cardiogenic pulmonary oedema presenting to an emergency department in Hong Kong: retrospective cohort study

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Objectives: To explore the epidemiology, treatment and outcome of acute cardiogenic pulmonary oedema (ACPO) in a Hong Kong emergency department (ED). Methods: This was a retrospective cohort study in a university hospital ED. Cases were identified from ED records and resuscitation room logbooks. The study extended from 1 September 2004 to 30 April 2005. Parametric tests and logistic regression were used to identify predictors of survival. Results: A total of 140 patients were identified, with a mean age of 75 years and male:female ratio of 1:1.4. Mean values (range) on presentation were as follows: pulse rate 103 beats/minute (36-108); blood pressure (BP) 169/88 mmHg (77-274/20-162) and respiratory rate 31 breaths/minute (12-88). Past medical history included previous ACPO (12.1%), diabetes (45.7%), chronic obstructive pulmonary disease (9.3%), ischaemic heart disease (45.0%), hypertension (72.1%) and congestive heart failure (40.7%). On admission, 47.1% had pH <7.35 and 40.7% had PaCO2 >5.5kPa. ED treatments included: sublingual nitrates (n=2), intravenous (IV) nitrates (n=89, median 10 mg/hr), IV frusemide (n=85, median 40 mg), IV morphine (n=25, median 3 mg). There were 21 patients on non-invasive ventilation; 27 intubations and 41 patients were admitted to the intensive care unit. Survival to discharge was 95.7%; and median length of hospital stay was 8 days. The 90-day all-cause hospital readmission rate was 30.0%. The 30-day mortality was 12.9% (n=18) and 90-day mortality was 29.3% (n=41). Logistic regression showed that past history of hypertension (p=0.0061), higher systolic BP on ED discharge (p=0.0102) and lower creatinine following treatment (p=0.035) were predictors of improved survival at 90 days. Conclusion: ACPO commonly presents to the ED in Hong Kong and has a high 90-day mortality. Previous hypertension, higher systolic blood pressure on leaving the ED and lower creatinine following treatment predict improved survival at 90 days. (Hong Kong J Emerg Med. 2006;13:148-154)
Introduction

Acute cardiogenic pulmonary oedema (ACPO) is a common medical problem presenting to the emergency department (ED). The condition has a poor prognosis with a reported in-hospital mortality of up to 20%. The high mortality rate is multifactorial in nature, but could perhaps be related to patients not receiving optimal treatment. The range of reported mortality rates suggests that there could be therapeutic differences worldwide in the emergency treatment of ACPO.

The main pharmacological treatments for ACPO comprise oxygen, frusemide, morphine, nitrates (both intravenous [IV] and sublingual [SL]) and occasionally oral angiotensin converting enzyme inhibitors (ACEI). Newer potential treatments including those involving atrial natriuretic peptide and other agents are currently being evaluated. Several studies have compared the efficacy of nitrates and frusemide with results favouring the former. A high dose of nitrates either as an initial IV bolus or infusion and low dose frusemide has been shown to be a superior combination for these patients.

The respiratory components of ACPO can be managed with non-invasive ventilation (NIV), non-invasive positive pressure ventilation (NIPPV), continuous positive airways pressure (CPAP) and bilevel positive airways pressure (BiPAP). Invasive techniques include endotracheal intubation and mechanical ventilation. NIPPV, a more recent form of ventilation which does not require intubation, has been used in the management of ACPO. Several studies have compared NIPPV with other forms of respiratory support in terms of outcome, including the need for intubation and mortality rates.

ACPO is associated with a poor prognosis. Studies have suggested that certain clinical and physiological characteristics and initial treatment are important prognostic factors. In particular, a low systolic pressure and ACPO associated with myocardial infarction were poor prognostic factors. Le Conte identified poor prognostic factors in terms of mortality rates, which included: observed mottling on presentation, low diuresis, high respiratory rate and lack of response to the initial treatment (six hours post treatment).

The aim of this study was to explore the epidemiology, treatment patterns and outcome of ACPO in a single Hong Kong ED.

Methods

The setting for this retrospective case note review was Prince of Wales Hospital (PWH), an acute general hospital with 1,200 beds within the New Territories East Cluster (NTEC) and it also functions as the primary teaching hospital of the Chinese University of Hong Kong (CUHK).