

Choking in Psychiatric Patients: Associations and Outcomes

精神病患者的哽塞病例：相關因素及結果

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Abstract

Objective: To examine the rate of choking incidents and the associated factors among Chinese psychiatric patients in Hong Kong over a 12-year period.

Methods: All choking incidents recorded in a large psychiatric unit in Hong Kong during the inclusive period January 1996 to December 2007 were retrospectively analysed with respect to demographic and clinical variables, and circumstantial factors at the time of the incident.

Results: Nineteen choking incidents involving 17 patients were identified. In psychiatric inpatients, the mortality rate due to choking was 8-fold higher than that of the general population. Different age-groups exhibited different clinical characteristics related to the incidents. Medication side-effects and poor eating habits were implicated as contributory causes.

Conclusion: Mental health professionals should have a high awareness of the increased risk from choking in psychiatric patients, identify those at high risk, and implement effective preventive measures.

Key words: Airway obstruction; Eating; Feeding behavior

摘要

目的：檢視12年內香港華籍精神病患者的哽塞病發率和相關因素。

方法：回顧1996年1月至2007年12月期間，香港一所大型醫院精神科部門的所有哽塞病例，並以統計人口學和臨床變數，和病發時的環境因素作出分析。

結果：研究包括17名患者共19宗哽塞病例。出現哽塞的住院患者，其死亡率較一般人高出8倍。各年齡組別也顯示不同的臨床特徵。藥物產生的副作用和不良飲食習慣也跟哽塞病發有關。

結論：臨床精神科醫護人員應對硬塞風險提高警覺，識別風險較高的患者類別，從而實施有效預防措施。

關鍵詞：呼吸道阻塞、進食、餵食行為

Introduction

Persons with mental illness are at 3- to 5-fold higher risk of sudden death compared with the non-psychiatric population.¹ Previous studies focused mainly on suicide and cardiac causes of sudden death.¹ Choking has been reported as another important cause of death in these patients, but most of the literature refers to data prior to the 1980s.² Few

recent studies show mental illness as a significant risk factor for death by choking.¹

In an analysis of choking deaths in Ireland over a 10-year period, Corcoran and Walsh³ found that 10% of sudden deaths among psychiatric inpatients were due to choking. Another study by Ruschena et al⁴ reported that in patients suffering from schizophrenia and organic brain syndrome, the relative risks of death by choking were 30 and 43 times that of the general population, respectively.

The causes of such excess risk from choking in psychiatric patients are still unclear. Proposed risk factors include: medications (especially extrapyramidal side-effects of typical antipsychotics),¹⁻⁵ seizures,⁵ tachyphagia,^{2,3} and circumstantial factors.^{1,3} Implementation of effective prevention may be difficult without identified causes.

Despite the significance of sudden death by choking, there were no data among Chinese psychiatric patients. This study aimed to determine the rate of choking incidents in

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psychiatric patients attending a large psychiatric unit in Hong Kong. The association between choking in psychiatric patients and various special characteristics (illness, treatment, environmental factors) and outcomes following choking episodes were also examined.

Methods

All patients reported to experience choking incidents in the Psychiatric Unit of the Pamela Youde Nethersole Eastern Hospital (PYNEH) from the inclusive period January 1996 till December 2007 were identified using the Hospital Patient Accident / Incident Report System. The PYNEH is a regional acute general hospital having approximately 400 to 600 psychiatric beds during the study period. The Psychiatric Unit managed patients admitted to acute and subacute wards, as well as to rehabilitation and psychogeriatric wards. It also provided day-patient and outpatient psychiatric services. The medical records of all patients with choking incidents were reviewed. A 'choking incident' was defined as a sudden obstruction of the airway by food, or a food bolus in the larynx or the laryngopharynx (the cafe coronary).^{1,3} Information on each patient's demographics, psychiatric and physical diagnoses, pharmacological treatment, circumstances of the choking, management of the episode and outcomes were also retrieved. Chlorpromazine-equivalent dosages^{6,7} were estimated for all patients receiving antipsychotics.

Statistical Analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences (Windows version 14.0; SPSS Inc, Chicago [IL], US), and included descriptive statistics on the extracted data. Characteristics were compared in young and elderly patients using the Chi-square test for categorical variables, and the Mann-Whitney *U* test for continuous variables. Incidence rates for choking events and mortality were calculated by comparing the number of events with psychiatric ward admission statistics. Postmortem reports were retrieved for deceased patients. The entire study was approved by the Ethics Committee of the PYNEH.

Results

Characteristics of Patients Involved in Choking Incidents

A total of 19 choking incidents involving 17 patients were identified in the 12-year period, 1 of which had occurred in an outpatient setting. The incidence of choking in an inpatient setting was extrapolated to be 68 per 100,000 psychiatric patients/year. For the 18 incidents in an inpatient setting, 9 (50%) occurred in psychogeriatric wards, 6 (33%) in acute wards, 2 (11%) in subacute wards, and 1 (6%) in a rehabilitation ward. One patient had 3 choking incidents during the study period. Apart from 1 patient who had a history of choking before admission (at an old age home), the remainder had no previous history of choking.

The age of these patients spanned from 18 to 87 years, with a mean of 62 and a median of 70 years. Seven (41%) of the patients were aged below 65 years, and 11 (58%) were males. Their mean and median lengths of stay were 20 and 8 months, respectively (range, 1-153 months). Three (16%) patients were already known to speech therapists, while 4 (21%) were referred after the incident.

The 2 commonest psychiatric diagnoses associated with choking were dementia and schizophrenia, which accounted for 42 and 37% of the patients with incidents, respectively. Mental retardation was also a common diagnosis, being encountered in 21% of the patients. Other psychiatric diagnoses included organic brain syndrome, delusional disorder, bipolar affective disorder, and depression. Neurological disorder (affecting 42% of the patients) was the commonest physical diagnosis. Six (32%) patients had epilepsy and 5 (26%) had a history of stroke (Table 1).

All but 2 patients with choking were receiving psychotropic medications, 90% of whom were taking antipsychotics. Regarding patients taking the latter, about 80% were prescribed typical antipsychotics and 26% were in receipt of atypical agents. Two patients were in receipt of both typical and atypical antipsychotics before their choking incident. Chlorpromazine-equivalent dosages were estimated to amount to 0 to 1400 mg, with a mean of 334 mg per day. Four (21%) patients reportedly had extrapyramidal side-effects. More than half (58%) of the patients were receiving anticholinergics, and 42 and 37% of them were also taking anticonvulsants and benzodiazepines, respectively. Three (16%) of them were in receipt of antidepressants before choking (Table 1).

Clinical Characteristics of Patients in Different Age-groups

The younger patients (< 65 years) in our cohort had different clinical characteristics than those who were older, being more likely to have mental retardation ($p = 0.003$), organic brain syndrome ($p = 0.05$), and bipolar affective disorder ($p = 0.05$). By contrast, elderly patients were more likely to suffer from dementia ($p = 0.01$). There was no statistically significant difference between the 2 age-groups with respect to their physical diagnoses. Younger patients were significantly more likely to be in receipt of atypical antipsychotics and benzodiazepines (Table 2), as well as higher chlorpromazine-equivalent daily dosages of antipsychotics (576 mg vs. 196 mg), though this difference was not statistically significant ($p = 0.10$).

Circumstances of the Choking Incidents

About half (53%) were imbibing a normal diet before the choking incident; the remainder took either a soft diet (42%) or boneless diet (5%). Visiting hours were associated with the highest frequency of choking ($n = 7$; 37%), followed by morning snack time (21%) and dinner time (16%). Most of these patients (59%) ate by themselves, and during visiting hours, 7 (37%) were fed by a relative, friend, old age home

Table 1. Clinical characteristics of the patient cohort with choking incidents.

Characteristics	No. (%) of patients*
Psychiatric diagnoses	
Dementia	8 (42)
Schizophrenia	7 (37)
Mental retardation	4 (21)
Organic brain syndrome	2 (11)
Delusional disorder	2 (11)
Bipolar affective disorder	2 (11)
Depression	1 (5)
Physical diagnoses	
Neurological	
Epilepsy	6
Cerebrovascular accident	5
Others	1
Orthopaedic	
Long bone fracture	2
Rheumatoid arthritis	1
Gastro-intestinal / hepatic	
Hepatitis	2
Oesophagitis	1
Metabolic	
Diabetes mellitus	1
Obesity	1
Hyperlipidaemia	1
Cardiovascular	
Deep vein thrombosis	2
Hypertension	1
Respiratory: tuberculosis	2 (11)
Urological: benign prostatic hypertrophy	1 (5)
Sensory: cataract	1 (5)
Medications	
Typical antipsychotics	15 (79)
Anticholinergics	11 (58)
Anticonvulsants	8 (42)
Benzodiazepines	7 (37)
Atypical antipsychotics	5 (26)
Antidepressants	3 (16)

* The sum of diagnoses or medications were greater than 19 as some patients had more than 1 diagnosis and received more than 1 type of medication.

staff, home-helper, or hospital volunteer. Patients being fed by others were aged above 70 years, except for a 21-year-old female who had mental retardation.

The commonest food involved with choking was bread in 26% of the incidents. Hospital meal sets and fruits (orange and apple) were also commonly implicated, explaining in 21 and 16% respectively of the incidents. Other types of implicated food included: dim-sum, biscuits, sweet

dumplings, green bean congee, pizza, and cake.

Presentations and Outcomes

Regarding the presentation of the choking episodes, 37% of the patients could not speak, 26% were noted to be cyanotic, and the remainder were flushed or pale. Of the 19 instances of reported choking, 7 (37%) entailed cardiac / respiratory arrest. After resuscitation, 6 patients were transferred to a medical ward or intensive care unit for further management, but 1 died in the psychiatric ward. Three of the 6 transferred patients subsequently died, and 1 developed aspiration pneumonia as late complication. Two were recovered and transferred back to the psychiatric ward for further management. The remaining 12 (63%) patients recovered after treatment. The Heimlich manoeuvre was the most commonly employed emergency management of choking (53%), followed by suction (47%) and backslaps (37%). The mortality of choking incidents in the inpatient setting was estimated to be 15 per 100,000 patient episodes.

Postmortem examination revealed bronchopneumonia and hypoxic brain damage in 2 of the patients. Examination of the other deceased patient yielded a stomach distended to about 4 times the normal size with undigested food; his trachea and right bronchus also contained undigested food, and microscopy of the lungs showed food particles in the airspace of the bronchi and alveoli. There was patchy pulmonary oedema in the lower lobes, but no evidence of bronchopneumonia or chronic lung disease. The anatomical diagnosis was asphyxia with undigested food in the airspaces from the trachea up to the alveoli.

Discussion

This study represented an early attempt to delineate the problem of choking incidents in psychiatric patients in Hong Kong. The annual incidence rates of choking incidents and mortality from choking in psychiatric patients were estimated to be 68 and 15 per 100,000, respectively. Given the corresponding mortality rate from choking has been estimated to be 1.9 per 100,000 incidents in the general population,³ in our psychiatric patients mortality from choking was about 8-fold higher. This was comparable to Corcoran and Walsh's finding of an 11-fold higher rate of deaths due to asphyxia in psychiatric inpatients than in the general population.³

Consistent with previous studies,^{2,8} patients with neurological disorders, especially epilepsy, had a higher risk of choking. Although most patients who choked were middle-aged or elderly, persons as young as 18 years also endured choking incidents. Most of the old patients had dementia and the younger ones were more likely to suffer from organic brain syndrome, mental retardation, or bipolar affective disorder. The 2 youngest patients (aged 18 and 21 years respectively) in our cohort had bipolar affective disorder and mental retardation.

Typical antipsychotics and anticholinergics were the 2 most commonly prescribed types of drugs in our patients

Table 2. Comparison of the clinical characteristics between the younger and older patients

	Adults (< 65 years) [n = 7]	Elderly (≥ 65 years) [n = 12]	Chi-square	p Value
Psychiatric diagnoses				
Organic brain syndrome	2 (29%)	0	3.83	0.05
Dementia	0	8 (67%)	8.06	0.01
Mental retardation	4 (57%)	0	8.69	0.003
Schizophrenia	3 (43%)	4 (33%)	0.17	0.68
Delusional disorder	0	2 (17%)	1.30	0.25
Depression	1 (14%)	1 (8%)	0.17	0.68
Bipolar affective disorder	2 (29%)	0	3.83	0.05
Physical diagnoses				
Neurological	4 (57%)	4 (33%)	1.03	0.31
Gastro-intestinal / hepatic	2 (29%)	1 (8%)	1.36	0.24
Orthopaedic	1 (14%)	2 (17%)	0.02	0.89
Respiratory	0	2 (17%)	1.30	0.25
Endocrine	1 (14%)	2 (17%)	0.02	0.89
Urological	0	1 (8%)	0.62	0.43
Sensory	0	1 (8%)	0.62	0.43
Cardiovascular	1 (14%)	2 (17%)	0.02	0.89
Treatment factors				
Extrapyramidal symptom	3 (43%)	1 (8%)	3.17	0.08
Typical antipsychotics	5 (71%)	10 (83%)	0.38	0.54
Atypical antipsychotics	4 (57%)	1 (8%)	5.43	0.02
Anticonvulsants	4 (57%)	4 (33%)	1.03	0.31
Benzodiazepines	6 (86%)	1 (8%)	11.38	0.001
Anticholinergics	5 (71%)	6 (50%)	0.83	0.36
Antidepressants	1 (14%)	2 (17%)	0.02	0.89

who suffered choking. Younger patients were more likely to receive atypical antipsychotics, the majority of whom also took benzodiazepines, while only 1 elderly patient received the latter type of medication.

Typical antipsychotics are presumed to affect swallowing mechanisms by dopamine blockade and / or anticholinergic effects.^{5,9} Dopamine blockade could lead to laryngospasm and dyskinesia of the tongue and oropharynx, resulting in dysphagia. Decrease in oesophageal motility, impairment of gag reflex, and delay in gastric emptying could result from anticholinergic effects of various psychotropic medications. The use of anticholinergics might also affect swallowing directly. In psychiatric patients, asphyxia has been linked to the dosages of neuroleptics and anticholinergics.¹⁰ Oversedation by psychotropic medications such as antipsychotics, benzodiazepines, and anticonvulsants might also impair reflexes involved in swallowing and protection of airway.

Overeating and tachyphagia is common in institutionalised psychiatric patients.² Psychotropic medications sometimes increase appetite or food craving through an effect on hypothalamus, through leptin and ghrelin metabolism.¹¹⁻¹⁴ Some elderly patients, chronic

schizophrenic and mentally retarded patients had poor dental health that might further impair the quality of food boluses to be swallowed. In this study, a postmortem examination which showed a stomach grossly distended with food could be explained by such effects. Decreased oesophageal motility and / or gastric emptying due to drug effects may also have complicated matters.

Choking is a relatively uncommon but preventable cause of death (American Heart Association, 2001)¹⁵. Therefore, primary prevention of choking should be of prime concern. It is necessary to screen patients at risk of choking by identifying the following risk factors on admission: being elderly, having a neurological disturbance (e.g. epilepsy or brain damage), or a psychiatric disorder (schizophrenia, dementia, and mental retardation). Patients and their caretakers should also be asked about swallowing difficulty or choking. For high-risk patients, referral to a speech therapist, as well as appropriate diet and direct supervision, should be offered.

Patients on psychotropic medications should be reviewed regularly for side-effects, notably extrapyramidal and anticholinergic side-effects. Polypharmacy should be avoided, especially in elderly patients. Patients should be

advised to eat slowly if they have a problem with overeating and tachyphagia. Relatives should be alerted to the possible choking risk in high-risk patients, and advised to feed those in their care slowly with appropriate types and amounts of food (as advised by speech therapists). Nursing staff should be trained to identify patients at high risk of choking and provide appropriate resuscitation measures if such incidents occur. Guidelines for evaluating patients at high risk of choking and the emergency management of choking should be available and used judiciously. Analyses of choking incidents and regular audit can help to monitor trends and implement effective risk management measures.

Our study had several methodological limitations. Retrieval of incidents depended on voluntary reporting. Clinically significant choking incidents were more likely to be reported, and minor incidents (involving immediate coughing out food without other interventions) might not be documented, which may underestimate the rate of such incidents. The small size of the study also limits making conclusions from our findings. Our sample consisted of patients admitted under Mental Health Ordinance in Hong Kong. Their illnesses would have been quite severe to warrant admission in this setting. Therefore the findings may not be generalisable. Information was collected retrospectively by case record review only. Also, there was no control group to compare the effect of various risk factors for choking in psychiatric patients.

This was the first study to explore the various factors associated with choking in Chinese psychiatric patients. It confirms the increased risk of death due to choking in psychiatric patients. Choking was associated with a combination of features, including: certain psychiatric diagnoses, neurological disorders, psychotropic medications, and various circumstantial factors. Mental health professionals need to have increased awareness of this risk and implement effective preventive measures.

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