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A snapshot of chronic obstructive airways disease in Australian emergency departments

澳洲急症室之慢性阻塞性氣道疾病簡報

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Objectives: To characterise emergency department (ED) attendances for chronic obstructive airways disease (COAD) by patient demographics and severity, to determine treatment and disposition of patients and to determine use of diagnostic tests and treatment provided to different severity groups. A secondary aim was to compare treatment given to established treatment guidelines. *Methods:* Prospective, observational cohort study of patients who presented to nine Australian ED with a primary diagnosis of acute exacerbation of COAD in October 2002. Information collected included demographics, duration of symptoms, co-morbidities, assessment findings, severity, treatment, disposition, tests, in-hospital mortality and length of stay. *Results:* A total of 137 patients were studied. Two-thirds (65%) of the group were male, and most (90%) were aged greater than 60 years. COAD severity was mild in 11%, moderate in 30% and severe in 59%, and 23% were receiving home oxygen therapy. As anticipated, patients with severe COAD were more likely to be admitted to hospital (mild: moderate: severe = 13%: 68%: 99%; p<0.0001) and to require ventilatory support (0%: 0%: 23%; p<0.002). There was under-utilisation of corticosteroids and antibiotics in the moderate and severe groups, and only 35% of the group had received influenza vaccination within the past year. *Conclusion:* This study showed that adherence to best practice guidelines with respect to the use of corticosteroids and antibiotics for patients who presented to the ED with COAD was sub-optimal, as was the prevalence of prior influenza vaccination. Other aspects of treatment and investigation were consistent with available evidence. Efforts to address these deficiencies should be developed. (*Hong Kong j.emerg.med.* 2005;12:84-90)

目的：描述急症室慢性阻塞性氣道疾病求診者的病人統計數據及病情嚴重程度，用以決定病人的治療及處置安排、決定不同嚴重程度組別中診斷測試的使用及給予的治療；另一目的是要跟確立的治療指引作出比較。**方法：**將二零零二年十月份到澳洲九所急症室求診，主要診斷為慢性阻塞性氣道疾病急性病情惡化的病者作前瞻性、觀察性及列隊性研究。收集的資料包括病人統計數據、症狀的持續期、共存的病態、評估的結果、病情的嚴重性、治療、處置安排、測試、住院的死亡率及留院期。**結果：**研究共有 137 名病者，男性病者佔群組的三分之二（65%），大部份（90%）年齡超過 60 歲；慢性阻塞性氣道疾病的嚴重程度為：輕度 11%、中度 30% 及嚴重 59%；23% 病者需接受家中氧氣治療。一如所料，嚴重慢性阻塞性氣道疾病病者大都需要住院（輕度：中度：嚴重 =13%：68%：99%；p<0.0001）；並需要輔助換氣（0%：0%：23%；p<0.002）。病情中度及嚴重的群組中，類固醇及抗生素的使用有不足的情況；群

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組中只有 35% 的病者在過去一年內曾接受流行性感冒疫苗。**總結：**這研究顯示在依循最佳做法指引方面，使用類固醇及抗生素治療到急症室求診的慢性阻塞性氣道疾病病者，情況並不理想；而早前曾接受流行性感冒疫苗的病者也不普遍；治療及檢測的其他方面則與現存證據吻合，故應致力發展處理以上不足之處。

Keywords: Chronic obstructive airways disease, hospital emergency service

關鍵詞：慢性阻塞性氣道疾病、醫院緊急服務

Introduction

Chronic obstructive airways disease (COAD) affects almost 10% of the adult population of Australia aged over 45 years.[1] The chronic nature of these conditions makes them high users of health care resources, including emergency departments (ED), with 9,862 hospital admissions in Victoria for COAD being reported in 1996-97 and a total cost of care exceeding $40 million.[2]

The only available data about the epidemiology, severity, treatment and disposition of ED patients with COAD came from the USA. That study suggested that adherence to treatment guidelines was low and that this might be contributing to sub-optimal clinical outcomes for this group of patients.[3] There was no similar data from the Australian ED setting.

The main objectives for this study were to characterise ED attendances for COAD by patient demographics and severity, to determine treatment in and disposition from ED and to identify differences in the use of diagnostic tests and treatment provided to different severity groups. A secondary objective was to compare treatment patterns with treatment guideline recommendations.

Methods

This prospective, observational study was conducted in nine Australian ED over a one-month period (1st October 2002 till 31st October 2002) [see acknowledgments for participating hospitals]. All ED accredited for training by the Australasian College for Emergency Medicine excluding specialist children's hospitals were approached by mail to participate. Nine participating hospitals volunteered and data were collected locally. This represented 11% of qualifying ED. Ethics committee approval was obtained for all centres, and consent was not required to enrol patients into the study as data was de-identified.

The subjects included patients with ED physician-diagnosed COAD presenting to the ED of participating hospitals. Participating hospitals used a consensus definition[4] for the diagnosis of exacerbation of COAD, which was "sustained worsening of the patient's condition, from the stable state and beyond normal day-to-day variations, that is acute in onset and necessitates a change in regular medication in a patient with underlying COAD". All patients were treated at the discretion of the treating ED physicians.

Data collected included demographic information, duration of attack, classification of the severity of the attack according to medical officer assessment, treatment, investigations, disposition (home, ward, intensive care unit/high dependency unit, transfer), whether there had been another ED attendance with COAD in the previous 12 months, in-hospital mortality and length of stay. The severity classification was based on the criteria of Rodriguez-Roisin (Table 1).[4]

Data were entered onto a specifically designed form and analysed using descriptive statistics. Quality checks on the data collected were not performed. Comparison of rates of admission, chest radiography, arterial blood gas (ABG) analysis, and requirement for ventilatory support were done by chi square test with odds ratios (with 95% confidence intervals) calculated. Assessment, treatment and disposition of patients with acute exacerbations of COAD were compared to recently published recommendations.[5,6]

Table 1. Staging of COAD exacerbation based on health-care utilisation[4]

Severity	Level of health-care utilisation
Mild	Patient has an increased need for medication, which he/she can manage in own normal environment
Moderate	Patient has an increased need for medication and feels the need to seek additional medical assistance
Severe	Patient/caregiver recognises obvious and/or rapid deterioration in condition, requiring hospitalisation

Results

A total of 137 patients were included in the study. Two-thirds (65%) of the group were male. Most (90%) patients were aged greater than 60 years. COAD severity was classified as mild in 11% of cases, moderate in 30% and severe in 59%; 23% of patients were receiving home oxygen therapy at the time of the index presentation; and 25% were referred to the ED by their general practitioners. The treatment and investigation of the study sample are summarised in Table 2.

Patients with severe COAD were more likely to be admitted than the mild and moderate severity groups (mild/moderate: severe=54%: 99%; p<0.0001, OR 68 [95% CI=9 to 527]). They also had longer hospitalisations compared with mild and moderate presentations (mild/moderate: severe=1: 5 [median days]; p<0.0001). Only patients who presented with severe COAD required ventilatory support (mild: moderate: severe=0%: 0%: 23%; p=0.0011). Of the 14 subjects who required ventilatory assistance, 11 (79%) received non-invasive positive pressure

Table 2. Summary of treatment and investigation by severity classification

Treatment		Mild (n=15)	Moderate (n=41)	Severe (n=81)
Bronchodilator		10/15 (67%)	37/41 (90%)	75/81 (93%)
Steroids	Total	8/15 (53%)	26/41 (63%)	61/81 (75%)
	Oral	7/15 (47%)	19/41 (46%)	22/81 (27%)
	Intravenous	1/15 (7%)	10/41 (24%)	42/81 (52%)
Antibiotics		2/15 (13%)	22/41 (54%)	48/81 (59%)
Oxygen		6/15 (40%)	34/41 (83%)	66/81 (81%)
Aminophylline		0/15	0/41	1/81 (1%)
Theophylline		0/15	0/41	3/81 (4%)
Ventilation		0/15	0/34	14/62 (23%)
Others				
Admitted		2/15 (13%)	28/41 (68%)	79/80 (99%)
Mortality Rate		0/14	0/41	9/77 (12%)
Re-attendance within 12 months		6/15 (40%)	28/41 (68%)	51/81 (63%)
General practitioner referral		6/14 (43%)	9/37 (24%)	19/73 (26%)
Flu vaccination in the last year		3/6 (50%)	11/25 (44%)	19/62 (31%)
Chest X-ray		7/13 (54%)	40/41 (98%)	76/77 (99%)
Arterial blood gas analysis		3/14 (21%)	32/41 (78%)	65/80 (81%)
Spirometry		3/13 (23%)	9/40 (23%)	7/72 (10%)
Length of stay	Range: hours	1 to 120	2 to 408	1 to 720
	Mean: hours (days)	26 (1.1)	93 (3.9)	149 (6.2)
	Median: hours (days)	4 (0.2)	72 (3.0)	120 (5.0)

ventilation (NPPV). Patients with moderate and severe COAD were more likely to have chest X-ray (mild: moderate: severe=54%: 98%: 99%; p<0.0001) and to have an ABG analysis (mild: moderate: severe=21%: 78%: 81%; p<0.0001). There were no deaths in the mild and moderate groups compared with 12% in the severe group (p=0.032).

With respect to treatment administered, there appeared to be under-utilisation of corticosteroids, antibiotics and oxygen, particularly in the moderate and severe groups. Of concern, only 35% of patients had received influenza vaccination within the past year.

Discussion

This is the first Australian multicentre study to examine ED management of COAD exacerbations, and to compare assessment and management with published guidelines. Recommendations of these guidelines for management of patients with COAD exacerbation are shown in Table 3. Adherence to the guidelines was patchy. More than 90% of patients with moderate and severe exacerbations of COAD in this study received bronchodilator therapy and very few patients (<4%) received aminophylline or theophylline. However, we have identified important differences between guideline recommendations and actual ED management of COAD exacerbations with less than optimal rates of corticosteroid and antibiotic use.

Sixty-two percent of patients in this study had presented to the same hospital within 12 months with an acute exacerbation of COAD. This did not take into account any presentations to other ED. This was consistent with previous findings. In a US study of patients with COAD discharged from ED, 21% had a relapse within two weeks.[7] Both acute and chronic factors were associated with increased risks. In a study of 128 patients who had been admitted to a major teaching hospital in New South Wales, Australia with exacerbation of COAD, there was a readmission rate within 12 months of 70%.[8] It has been reported in the United States that more than 50% of patients discharged from hospital after an acute hospital admission with an acute exacerbation of COAD were readmitted more than once in the following six months after discharge.[9] While this might simply reflect the chronicity of the disease, it might also be related to deficits in the quality of care, both in hospital and in the community. Better adherence to guideline recommendations when caring for patients with COAD exacerbations and better post acute care might lead to improved clinical outcomes, including reduced rates of re-attendance.

Of this cohort, 9 patients (7%) died during hospital admission. All deaths were from patients who presented with severe exacerbations, giving a mortality rate of 12% for this group of patients. This was comparable to a reported mortality rate of 11% for 1,016 patients with severe COAD in a study conducted in the USA.[10]

Table 3. Recommendations of treatment guidelines for patients who present with an acute exacerbation of COAD

Evaluation	American College of Chest Physicians and American College of Physicians – American Society of Internal Medicine 2001[5]	Global Initiative for Chronic Obstructive Lung Disease 2001[6]
Spirometry	Not addressed	Not recommended
Arterial blood gas analysis	Not addressed	Recommended
Chest X-ray	Recommended	Recommended
Oxygen therapy	Recommended	Recommended
Beta-agonists	Recommended	Recommended
Corticosteroids	Recommended	Recommended
Antibiotics	Recommended	Recommended

Supplementary oxygen therapy to achieve adequate levels of oxygenation (SpO_2>90%) is the keystone treatment for patients with acute exacerbations of COAD.[6] In this study, oxygen therapy was given to the majority of patients with moderate and severe presentations (82%). Reasons that this was not higher might include documentation omissions, failure to appreciate the severity of disease or importance of oxygen or fear that administration of oxygen might adversely disrupt patients' hypoxic drive resulting in CO_2 retention and deterioration.

In this study there was under-utilisation of corticosteroids, with 47% of mild cases, 37% of moderate cases and 25% of severe cases not receiving steroid treatment. The reason for this was unclear but might represent failure to appreciate the role of corticosteroids in COAD management. A recent randomised controlled trial of 271 patients receiving systemic glucocorticosteroid demonstrated a moderate improvement in clinical outcomes for patients hospitalised for exacerbations of COAD.[11] This was confirmed by a systematic review.[12] Recent guidelines recommend steroid treatment in the management of COAD exacerbation to restore lung function, decrease relapse rates and shorten recovery time.[5,6]

Chest X-ray is a recommended form of assessment for patients presenting with an acute exacerbation of COAD.[5,6] Not surprisingly, in our study most patients in the moderate and severe categories had a chest X-ray (>98%), which was consistent with the guidelines. ABG analysis is considered essential for patients with severe exacerbations of COAD.[6] Most patients who presented with moderate and severe presentations in this study had ABG analysis (>78%). It is possible that in some cases blood gas analysis was deferred basing on pulse oximetry monitoring, conscious state, response to therapy and/or venous pH measurement.

It has been recognised that the most common cause of acute exacerbations of COAD was infection.[6,10,13] The administration of antibiotics is recommended by both reference guidelines. Overall, only 53% of the patients in our study received antibiotics in the ED (57% of the moderate and severe groups). The likely explanation was a failure to appreciate the role of antibiotics in COAD. This study did not examine which antibiotic was used. It was possible that even when they were used, an inappropriate agent might have been chosen.

Measurement of pulmonary lung function by spirometry was performed infrequently, consistent with the guidelines and previous research.[5]

The findings that increased severity of COAD resulted in a greater likelihood of admission, a higher likelihood of assisted ventilation and longer duration of hospitalisation were not unexpected. For patients who required ventilatory support, 11 (79%) had NPPV. Evidence supports the use of NPPV as it appears to reduce the requirement for invasive mechanical ventilation.[14] A prospective multicentre randomised controlled study in the UK compared NPPV with standard therapy in patients with mild to moderate acidosis during an acute exacerbation of COAD[15] and showed more rapid improvement, a reduction in the need for invasive mechanical ventilation and a reduction of in-hospital mortality.

Only 35% of the patients in this study had influenza immunisation within the past year, despite strong evidence for protection against both hospitalisation and death in patients with chronic lung disease.[16] The Global Initiative for Chronic Obstructive Lung Disease (GOLD) summary recommends vaccination at least annually for patients with COAD.[6] This represents a failure of community vaccination programs for this group.

This study has some limitations that should be considered when interpreting the results. The ED that participated did so voluntarily. They may represent ED with a particular interest in COAD management and thus generalisability to other ED cannot be guaranteed. Patients were identified prospectively. While every attempt was made to include all eligible patients, some might have been missed. However, this was unlikely to have resulted in any systematic selection bias. The diagnosis of exacerbation of COAD was based on ED physician judgement rather than objective measures of lung function. Some patients included might not have been suffering from COAD. The sample did

however represent a 'real world' sample and thus we consider the treatment patterns found to be valid. Data for this prospective observational study was reliant on accurate and thorough documentation by clinicians. It was possible that some information was missing, however all sites were educated about the importance of data entry and the data form was simplified. This study was purely descriptive and did not attempt to analyse between hospital variations in patient attendance patterns, demographics, severity or treatment. While there might be differences, the samples from each hospital would have been too small to analyse these meaningfully. It would also have detracted from our intention to provide an overview of what was happening in Australia in order to form the basis for systems improvements, rather than to perform hospital-hospital comparisons. Despite these limitations, the authors believe that the study is representative of COAD assessment and management in Australia and provides useful information to guide future decision-making.

Conclusion

This study has shown that adherence to best practice guidelines with respect to the use of corticosteroids and antibiotics for patients with COAD in ED was sub-optimal, as was the prevalence of influenza vaccination in this group. Other aspects of treatment and investigation were consistent with available evidence. Efforts to address these deficiencies should be developed.

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