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Mortality in men admitted to hospital with acute urinary retention: database analysis

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ABSTRACT

Objectives To investigate mortality in men admitted to hospital with acute urinary retention and to report on the effects of comorbidity on mortality.

Design Analysis of the hospital episode statistics database linked to the mortality database of the Office for National Statistics.

Setting NHS hospital trusts in England, 1998-2005.

Participants All men aged over 45 who were admitted to NHS hospitals in England with a first episode of acute urinary retention.

Main outcome measures Mortality in the first year after acute urinary retention and standardised mortality ratio against the general population.

Results During the study period, 176 046 men aged over 45 were admitted to hospital with a first episode of acute urinary retention. In 100 067 men with spontaneous acute urinary retention, the one year mortality was 4.1% in men aged 45-54 and 32.8% in those 85 and over. In 75 979 men with precipitated acute urinary retention, mortality was 9.5% and 45.4%, respectively. In men with spontaneous acute urinary retention aged 75-84, the most prevalent age group, the one year mortality was 12.5% in men without comorbidity and 28.8% in men with comorbidity. The corresponding figures for men with precipitated acute urinary retention were 18.1% and 40.5%. Compared with the general population, the highest relative increase in mortality was in men aged 45-54 (standardised mortality ratio 10.0 for spontaneous and 23.6 for precipitated acute urinary retention) and the lowest for men 85 and over (1.7 and 2.4, respectively).

Conclusions Mortality in men admitted to hospital with acute urinary retention is high and increases strongly with age and comorbidity. Patients might benefit from multi-disciplinary care to identify and treat comorbid conditions.

INTRODUCTION

Although acute urinary retention is a direct manifestation of progression of benign prostatic hyperplasia,

several studies have also found associations with major morbidities.¹⁻⁴ Occurring either spontaneously or after a precipitating event, it may therefore be a "harbinger" of severe systemic disease. We studied to what extent the occurrence of acute urinary retention among men admitted to hospital confers an increased risk of death compared with men in the general population of similar age.

METHODS

Data—We extracted data from the hospital episode statistics (HES) database of admissions to NHS hospitals in England. A unique patient identifier allowed us to link records of different hospital admissions in the same patient. Each record contains diagnostic fields and operative procedure fields. For all admissions after 1 April 1998, the HES database was linked to the mortality database of the Office for National Statistics.

Definitions—A patient had primary acute urinary retention (acute urinary retention for the first time) if there was no record in the HES database of a previous admission for this condition in at least the preceding six months. We defined acute urinary retention as spontaneous if it was recorded in the first diagnostic field or if benign prostatic hyperplasia was the primary diagnosis and acute urinary retention was recorded in another diagnostic field. In all other cases we considered it to be precipitated.⁵⁻⁷

Inclusion criteria—To identify admissions of men aged over 45 who had primary acute urinary retention, we followed a stepwise process. Firstly, we selected the records of all 229 089 men who were admitted at least once with a diagnostic code indicating acute urinary retention in any of the first seven diagnostic fields from 1 April 1998 to 31 March 2005. Secondly, we sequentially deleted the records of patients with codes for prostate cancer, multiple sclerosis, and for Parkinson's disease in any diagnostic field of any record. Thirdly, we excluded the records of men who

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were admitted for acute urinary retention in the period from 1 April 1998 to 30 September 1998 to include only men with primary acute urinary retention.

Identification of comorbidity—We used an adaptation of the Charlson score designed for use with administrative data.^{8,9} Comorbid disease was defined as present if it appeared in the records of the index admission (the admission for primary acute urinary retention) or of admissions that occurred in the six months before the index admission.

Statistical analysis—We used the Kaplan-Meier method to estimate age specific mortality within 90 days and one year after primary acute urinary retention. To compare mortality within the first year with that of men in the general population, we calculated standardised mortality ratios according to age and comorbidity.

RESULTS

From 1 October 1998 to 31 March 2005, 176 046 men were admitted to NHS hospitals with a diagnosis of primary acute urinary retention. Of these men, 100 067 (56.8%) had spontaneous acute urinary retention (mean age 73.5 (SD 10.5) years) and 75 979 (43.2%) had precipitated retention (mean age 74.5 (SD 10.9) years). In all age groups, mortality was higher in men with precipitated acute urinary retention.

Overall, 14.7% of men with spontaneous acute urinary retention and 25.3% men with precipitated acute urinary retention died within the first year. About half of these deaths (54.9%) occurred within the first 90 days.

In men with spontaneous acute urinary retention, mortality at one year increased strongly with age, from 4.1% in patients aged 45-54 to 32.8% in those aged 85

and over. In men with precipitated acute urinary retention, mortality at one year increased to a similar extent in the corresponding age groups from 9.5% to 45.4%.

In men aged 45-54 years, compared with the general population there was a 10-fold increase in mortality in those with spontaneous acute urinary retention and an almost 24-fold increase in mortality in men with precipitated acute urinary retention. The corresponding increases in men aged 85 and over were 1.7-fold and 2.4-fold, respectively.

More than a third of men with acute urinary retention had at least one major comorbid condition (table). Comorbidity was more prevalent in men with precipitated rather than acute urinary retention (43.5% *v* 29.1%). The presence of comorbidity greatly increased mortality.

One year mortality was high in men with comorbidity in the oldest age group. The age specific relative increase compared with the general population, however, was again highest in the youngest age group.

Even in men without comorbidity as defined by the Charlson score, mortality within the first year after acute urinary retention was considerably higher than in the general population (table).

DISCUSSION

Mortality after primary acute urinary retention in men admitted to hospital is high. We found that one in seven men with spontaneous acute urinary retention and one in four with precipitated acute urinary retention died in the first year. Mortality increased strongly with age and the presence of comorbidity. Consequently, about half of the men aged 85 and over with at least one comorbid condition died within the first year after acute urinary

Age specific mortality within one year after spontaneous and precipitated primary acute urinary retention and standardised mortality ratios (SMR) with and without comorbidity

Age group	Men without comorbidity (Charlson score 0)				Men with comorbidity (Charlson score ≥1)			
	Total admissions	Deaths	1 year Rate (95% CI)	SMR (95% CI)	Total admissions	Deaths	1 year Rate % (95% CI)	SMR (95% CI)
Spontaneous acute urinary retention								
45-54	4 590	77	1.8 (1.4 to 2.2)	4.4 (3.4 to 5.4)	990	139	14.7 (12.6 to 17.2)	36.5 (30.7 to 43.1)
55-64	10 987	232	2.3 (2.0 to 2.6)	2.1 (1.9 to 2.4)	2 931	460	16.7 (15.4 to 18.2)	15.8 (14.4 to 17.4)
65-74	21 981	1 099	5.3 (5.0 to 5.6)	1.8 (1.7 to 1.9)	8 680	1 723	21.0 (20.1 to 21.9)	7.1 (6.8 to 7.4)
75-84	24 155	2 843	12.5 (12.1 to 13.0)	1.6 (1.5 to 1.6)	11 931	3 227	28.8 (27.9 to 29.6)	3.7 (3.5 to 3.8)
≥85	9 268	2 400	27.3 (26.4 to 28.2)	1.4 (1.3 to 1.4)	4 554	1 915	44.3 (42.8 to 45.8)	2.3 (2.2 to 2.4)
Total	70 981	6 651	9.9 (9.7 to 10.2)	1.6 (1.5 to 1.6)	29 086	7 464	27.2 (26.7 to 27.7)	3.7 (3.6 to 3.8)
Precipitated acute urinary retention								
45-54	3 522	114	3.4 (2.9 to 4.1)	8.4 (6.9 to 10.1)	1 457	339	24.3 (22.1 to 26.6)	60.4 (54.2 to 67.2)
55-64	5 496	235	4.5 (4.0 to 5.1)	4.3 (3.8 to 4.9)	3 240	808	26.0 (24.5 to 27.6)	25.1 (23.4 to 26.9)
65-74	11 426	880	8.1 (7.6 to 8.6)	2.7 (2.6 to 2.9)	9 035	2 612	30.0 (29.1 to 31.0)	10.3 (9.9 to 10.7)
75-84	14 869	2 571	18.1 (17.5 to 18.8)	2.3 (2.2 to 2.4)	13 279	5 140	40.5 (39.6 to 41.3)	5.2 (5.1 to 5.4)
≥85	7 578	2 778	38.0 (36.9 to 39.2)	2.0 (1.9 to 2.0)	6 077	3 205	54.7 (53.4 to 55.9)	2.8 (2.7 to 2.9)
Total	42 891	6 578	16.1 (15.7 to 16.4)	2.3 (2.2 to 2.3)	33 088	12 104	38.1 (37.6 to 38.6)	5.0 (4.9 to 5.1)

retention. Although mortality in men under 55 without comorbidity is not as high, it was still at least four times higher than that observed in men of similar age in the general population.

Methodological limitations

We included only men who were admitted to hospital and did not consider those who were treated within primary care or solely in a hospital emergency department. Those patients might have been in a better overall condition than those admitted, though we consider it unlikely that we missed a substantial number (see bmj.com for details).

The Charlson score based on administrative data underestimates the prevalence of comorbid disease.¹⁰ A more accurate instrument could have shown an even more marked impact of comorbidity.

The reported mortality after acute urinary retention was based on the linkage between the HES database and the mortality database of the Office for National Statistics. Most (96%) patients had a date of death that was based on robust linkage methods. See bmj.com for methods used to account for contradictory linkage.

Comparison with other studies

The only other study to date that provides some evidence on mortality after acute urinary retention found that the 1242 men who underwent a prostatectomy after acute urinary retention had a higher mortality in the first 90 days (3.0%) compared with the 2724 men who had surgery for symptoms alone (0.7%).¹¹ Other studies that have reported on outcomes after acute urinary retention tend to focus only on recurrence and the need for prostatic surgery.^{5,7}

Increasing age and comorbidity have also been found to be important predictors of outcome in men with fractured neck of femur.^{12,13} The comparison with fractured neck of femur shows that acute urinary retention constitutes a health problem of a similar magnitude. Although the overall one year mortality was lower than that observed after fractured neck of femur, the incidence of primary acute urinary retention, is higher (3.1 v 2.4 per 1000 men per year, based on HES data).

Explanations for the increased mortality

Though acute urinary retention is generally considered to be a urological emergency, serious consequences are rare with appropriate treatment. Our finding of a high mortality in the first year seems to contradict this. An obvious explanation for the increased mortality is that occurrence exposes men to risks associated with admission to hospital, catheter related and other nosocomial infections, and invasive procedures that often need a general anaesthetic.

However, the high mortality seems to be linked mainly to comorbidity for several reasons. Firstly, the presence of comorbidity according to the Charlson score substantially increased mortality within patients of similar age and with the same type of acute urinary

WHAT IS ALREADY KNOWN ON THIS TOPIC

The incidence of acute urinary retention strongly increases with age

Acute urinary retention seems to be associated with severe systemic disease

WHAT THIS STUDY ADDS

One in seven men admitted to hospital with spontaneous acute urinary retention and one in four with precipitated acute urinary retention die within a year

Mortality is considerably higher in older men and in those with comorbidity

Patients with acute urinary retention are a vulnerable group and may benefit from urgent multi-disciplinary care to identify and treat comorbid conditions

retention. Secondly, mortality was also higher in patients with precipitated rather than spontaneous retention. Thirdly, there seems to be a “dose-response” relation as the lowest mortality was found in patients with spontaneous retention and no comorbidity according to the Charlson score and the highest mortality in patients with precipitated retention and comorbidity. Lastly, a detailed inspection of the diagnostic fields in patients with spontaneous acute urinary retention and no comorbidity apparent showed that 58% of these patients had at least one diagnosis not related to the prostate and not captured by the Charlson score.

Of the patients who had comorbidity according to the Charlson score, irrespective of the type of acute urinary retention, about 30% had cardiovascular disease, 25% diabetes, 25% chronic pulmonary disease, and 15% a malignancy. The relatively high prevalence of cardiovascular disease and diabetes is consistent with the findings of recent aetiological studies linking hypertension and metabolic syndrome with the progression of benign prostatic hyperplasia.^{3,4}

Clinical implications

The high mortality observed in men admitted to hospital with acute urinary retention reinforces the importance of adopting a multi-disciplinary approach to their assessment and management.¹⁴ Men with acute urinary retention should undergo a comprehensive investigation for comorbid disease. The extent to which mortality after acute urinary retention can be reduced, however, will depend on the comorbidities involved and the effectiveness of the available treatments.

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Financial ties and concordance between results and conclusions in meta-analyses: retrospective cohort study

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ABSTRACT

Objective To determine whether financial ties to one drug company are associated with favourable results or conclusions in meta-analyses on antihypertensive drugs.

Design Retrospective cohort study.

Setting Meta-analyses published up to December 2004 that were not duplicates and evaluated the effects of antihypertensive drugs compared with any comparator on clinical end points in adults. Financial ties were categorised as one drug company compared with all others.

Main outcome measures The main outcomes were the results and conclusions of meta-analyses, with both outcomes separately categorised as being favourable or not favourable towards the study drug. We also collected data on characteristics of meta-analyses that the literature suggested might be associated with favourable results or conclusions.

Results 124 meta-analyses were included in the study, 49 (40%) of which had financial ties to one drug company. On univariate logistic regression analyses, meta-analyses of better methodological quality were more likely to have favourable results (odds ratio 1.16, 95% confidence interval 1.07 to 1.27). Although financial ties to one drug company were not associated with favourable results, such ties constituted the only characteristic significantly associated with favourable conclusions (4.09, 1.30 to 12.83). When controlling for other characteristics of meta-analyses in multiple logistic regression analyses, meta-analyses that had financial ties to one drug company

remained more likely to report favourable conclusions (5.11, 1.54 to 16.92).

Conclusion Meta-analyses on antihypertensive drugs and with financial ties to one drug company are not associated with favourable results but are associated with favourable conclusions.

INTRODUCTION

A high and increasing proportion of biomedical researchers have financial ties to the pharmaceutical industry.¹⁻⁴ Such researchers are more likely to publish articles that support the industry's products.^{3,5-11}

Meta-analyses represent the highest level of research evidence,¹² and drug companies have started to reference them in their advertisements.¹³

Some antihypertensive drugs have been shown to dramatically improve mortality and morbidity. The market for these and other antihypertensive drugs is highly competitive and lucrative. Our literature search found many published meta-analyses on antihypertensive drugs. If these are unbiased they have the potential to guide policy and save lives. We examined whether financial ties to one drug company were associated with favourable results or conclusions in meta-analyses on antihypertensive drugs.

METHODS

We included meta-analyses published up to December 2004 that evaluated the effects of antihypertensive drugs on clinical outcomes in adults. The comparator could be placebo, no treatment, usual care, or active

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