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UROLITHIASIS

Mortality due to urolithiasis in England and Wales: updated findings from a national database over a 23-year period

Patrick Juliebø-Jones[1,2,3], Øyvind Ulvik[1,2], Mathias Sørstrand Æsøy[1], Peder Gjengstø[1], Christian Beisland[1,2], Bhaskar K. Somani[4]

[1]Department of Urology, Haukeland University Hospital, Bergen, Norway
[2]Department of Clinical Medicine, University of Bergen, Bergen, Norway
[3]EAU YAU Urolithiasis group
[4]Department of Urology, University Hospital Southampton, United Kingdom

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Corresponding author
Patrick Juliebø-Jones
Haukeland University Hospital
Department of Urology
65 Jonas Lies vei
Bergen, Norway
phone: +47 55 97 50 00
jonesurology@gmail.com

Introduction Urolithiasis is a recognised disease of prevalence, and although not common, fatal sequelae can occur. There are few studies with population-based data that provide an overview of the mortality burden associated with this condition. Our aim was to perform an update based on national data from England and Wales.

Material and methods A search was performed of the database available through the Office of National Statistics (ONS), which collates relevant information from all death certificates in England and Wales. The cause of death is classified according to the conditions listed in the International Classification of Diseases, Tenth Revision (ICD-10). The codes N 20–23 were utilised. Data were collected on gender, location in the upper or lower urinary tract, and age.

Results Over the 23-year period, 3717 deaths caused by urolithiasis were recorded. The male-to-female ratio was 1:1.4. However, this gender gap steadily closed over time. The mean number of deaths per year was 161 (range: 98–308 year), and this gradually increased over the study period. By 2021, urolithiasis accounted for 0.1% of deaths in England and Wales. Over half of the deaths (64.9%) were in persons aged ≥75 years, while the mortality rate in persons under 50 years old was less than 4%. 0.1% of the deaths occurred in children under 15 years of age, and these were all females.

Conclusions The number of deaths caused by urolithiasis has increased in England and Wales. Although mortality is higher among females, this gender gap is narrowing.

Key Words: mortality ‹› urolithiasis ‹› urinary calculi ‹› sepsis

INTRODUCTION

Urolithiasis is recognised as a disease of prevalence, and approximately 10% of persons in Europe will experience a stone event during their lifetime [1]. While it is grouped as a benign urological condition, urolithiasis is well known to have the potential to result in serious illnesses such as sepsis. However, while there are many studies reporting the incidence and prevalence of urolithiasis at a population-based level, there are surprisingly few that focus on the mortality rates associated with this condition. The few studies that do exist mostly focus on mortality after endourological surgery, and relatively few have been performed at a population-based level [2, 3]. In light of the lack of studies reporting mortality associated with urolithiasis, our aim was to perform an update based on national data from England and Wales.

MATERIAL AND METHODS

A search was performed of the database available through the Office of National Statistics (ONS) as well as previous publications of archived data [4, 5].

The ONS organisation collates relevant information from all death certificates in England and Wales. The cause of death is classified according to the conditions listed in the International Classification of Diseases, Tenth Revision (ICD-10). Given that all the information was anonymised at source and freely available to the public, ethical approval was not deemed to be required. Data were available between the years 1999 and 2021. The ICD-10 codes N 20–23 were utilised. Data were collected on gender, location in the upper or lower urinary tract, and age. Data on the latter were only available from 2013 to 2021.

RESULTS

Over the 23-year period, 3717 deaths caused by urolithiasis were recorded, with a male-to-female ratio of 1:1.4. During the study period, the male-to-female ratio decreased from 1:1.7 to 1:1.1. The mean number of deaths per year was 161 (range: 98–308 year). There was a steady increase in the number of deaths recorded per year (Figure 1). From 1999 to 2006 it increased by 0.4 deaths per year, from 2007 to 2014 it increased by 5.1 deaths per year, and from 2015 to 2021 it increased by 19.1 deaths per year. This gradual increase in the absolute number of deaths meant that by 2021 0.1% of all deaths in England and Wales were caused by urolithiasis. This was the first time this level had been reached. 7.5% of all stones were located in the lower urinary tract (LUT), and the remainder were located in the upper urinary tract (UUT). In this group, males were more likely to be affected, with a male-to-female ratio of 2.9:1.
Since 2013, 64.9% of deaths were in persons aged ≥75 years. The mortality rate in persons under 50 years old was less than 4%. 12.12% of deaths occurred in persons aged ≥ 90 years. When broken down into 5-year periods and by gender, the highest proportion of deaths occurred in females (18.35%) aged 85–89 years and in males (20%) aged 80–84 years. 0.1% of deaths occurred in children (all females) under 15 years of age. Apart from one case, all other persons were residents of England and Wales. The highest proportion of deaths (34.3%) due to lower urinary tract stones was in people between 85 and 89 years old.

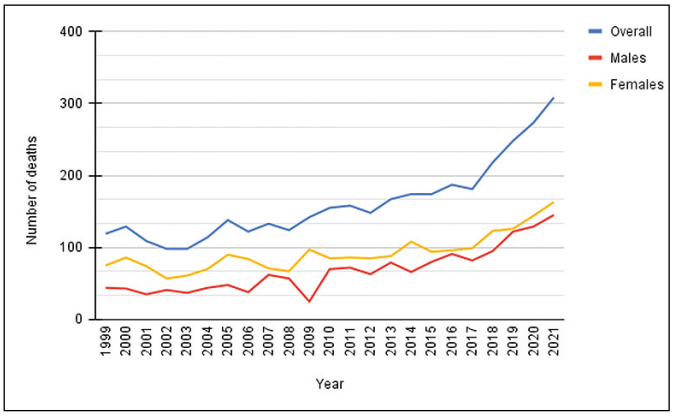

Figure 1. *Trends of absolute numbers of deaths due to stone disease over time.*

DISCUSSION

Key findings

The absolute number of deaths caused by urolithiasis in England and Wales has increased over the past quarter century. This has been mirrored by an increase in the percentage of total deaths caused by urolithiasis, which reached 0.1% in 2021. As a reference, cancer (all malignant neoplasms) accounted for 24.7% of all deaths in England and Wales in that same year. Elderly patients (≥75 years old) represent the group with the highest percentage of deaths (64.9%).
A recent analysis of United Kingdom hospital episode statistics (HES) revealed that the number of UUT stone episodes has increased overall [6]. While this rate was static among persons of working age, it increased by 9% among those aged >60 years. Management of urolithiasis in the elderly is clinically challenging. In a population-based study by Penniston et al., the authors found 2 peaks in stone incidence, between 60 and 64 years old and between 80 and 84 years old [7]. In a study of 1590 stone formers, Krambeck et al. found that with increasing age, the clinical presentation of a stone episode was more likely to be atypical pain or no pain. Endourological intervention can also be associated with a higher morbidity profile, especially in patients with poorer functional status [8]. A recent study reporting outcomes of ureteroscopy (URS) in patients ≥85 years old found the overall postoperative complication rate to be 41%, and the mortality rate at 12 months was 23% [9]. Diagnosing and treating urolithiasis in the elderly can therefore be complex. Given the ageing population, clinicians are likely to be faced with such decisions more frequently.
Multiple studies have recorded a gender gap in terms of the prevalence of urolithiasis in males and females [10]. While this has traditionally been estimated at 3:1 (males:females), evidence suggests that this difference is now narrowing [11]. However, while fewer females may be affected by stone disease, they are at higher risk of complications after endourological intervention [12]. Sepsis accounts for over 50%

of patients who die after URS [13]. In an analysis of infectious complications after URS based on over 70,000 cases, 0.5% had a critical care admission, and the mortality rate was 0.18% [14].

Limitations and strengths

Several limitations are present: Registration of the data did not specify if urolithiasis was a primary or secondary cause of death. It is not known whether any of these events were related to an operation. In addition, the range of parameters available for collection and subsequent analysis was limited. The accuracy of death certificates for the coding of urolithiasis must also be considered, and whether it can be relied upon. A previous study was performed by Turner et al., in which the authors evaluated the death certificates of patients in a prostate cancer trial in the United Kingdom [15]. Each of them (n = 1236) was reviewed by an expert panel, and an overall accuracy rate of 92% was recorded. These data offer a unique insight into the mortality related to urolithiasis on a national level, which is currently underreported globally.

CONCLUSIONS

The number of deaths caused by urolithiasis has increased in England and Wales. Although mortality is higher among females, this gender gap is narrowing.

CONFLICTS OF INTEREST

Øyvind Ulvik has acted as a consultant for Olympus. The other authors have nothing to declare.

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