testing (luckily all gave negative results) until our local laboratory was able to support us with prospective testing. We were one of the first units (perhaps the first) to take these precautions, which probably accounts for the absence of hepatitis in our unit. Even at the time of the Rosenheim committee only about a quarter of units were using blood that had been tested for hepatitis B antigen despite the number of cases of hepatitis that had occurred.

European register

In 1963 William Drukker from Amsterdam suggested that we should start a register of all patients being treated for end stage renal failure; he collected the data on dialysis and I collected data on transplants. It was the beginning of what is known as the European Dialysis and Transplant Association Register and one of the first attempts at medical audit. He left in 1970

and I gave the first combined report in 1971. The register continued and became a great success, eventually being taken over by Tony Wing.

Conclusion

In these memoirs I have tried to describe some of the problems that arose when dialysis was introduced in the United Kingdom. There is no space to follow through its use in chronic renal failure or for the many other anecdotes I would like to have told. I feel privileged to have participated in its introduction and would like to pay tribute to my five main teachers, all with international reputations but in four different disciplines—namely, Professors Pyrah and Spiers in Leeds, Professor Huggins in Chicago, and Professor Moore and Dr Merrill in Boston. They spent hours teaching and encouraging me, and their inspiration spurred me on.

Urinary retention and the lunisolar cycle: is it a lunatic phenomenon?

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Abstract

Objective—To determine whether a relation exists between urinary retention and temporal rhythms exists.

Design—Retrospective analysis of patients presenting over three years.

Setting—Urology departments in two hospitals.

Patients—815 Patients presenting as emergency admissions with urinary retention and requiring immediate decompression of the bladder.

Main outcome measures—Calendar date of each admission to determine circadian, monthly, and seasonal periodicity.

Results—No association was found between urinary retention and circadian, monthly, or seasonal rhythms. A significantly higher ($p < 0.001$) incidence of urinary retention was observed during the new moon in comparison with other phases of the lunar cycle.

Conclusions—Urinary retention is periodic in nature. This should be considered when the workload of a specialist urological department is organized.

Introduction

Retention of urine is common. Benign fibromuscular hyperplasia, which affects up to a quarter of the male population,¹ is the most common cause. The immediate cause of this complication is unclear as most men will have a history of longstanding obstruction of outflow before presenting urgently. Identification of factors likely to precipitate acute urinary retention is important as a pre-emptive operation may reduce the mortality from emergency prostatectomy.^{2,3}

The development of urinary retention in benign prostatic hypertrophy seems to be complex, having a non-fluctuant mechanical component due to adenomatous enlargement and a variable dynamic element secondary to autonomically regulated tone within the capsular muscle.⁴ Various organ systems including the autonomic nervous system can be influenced by external environmental factors,^{5,7} and rhythmic activity, particularly lunisolar periodicity,

has a distinct bearing on the homeostatic regulation of compartmental fluid shifts and micturition in lower life forms.^{8,9} We studied whether non-biological environmental factors, which may be responsible for altered sympathetic activity or an increased water load on the failing bladder, could precipitate detrusor decompensation. We examined true periodic phenomena such as daily (circadian), monthly, seasonal, and lunar rhythms and social influences that alter fluid throughput, such as weekend and festive drinking.

Patients and methods

We analysed retrospectively all male patients presenting urgently with urinary outflow obstruction and requiring immediate bladder decompression between August 1985 and July 1988 in Portsmouth. We studied the calendar dates of presentation to determine the circadian, monthly, and seasonal periodicity, lunar relations being determined by reference to standard observatory charts.

Circadian presentations were measured as the number of cases of urinary retention occurring on each day of the week and analysed as the total number presenting on that day on an annual basis (a solar year). To determine whether there was any difference in the number of cases of retention during weekdays and weekends the total number of presentations a day on weekdays (Monday to Thursday) and weekends (Fridays to Sundays) were calculated for each solar year and compared.

Monthly presentations were measured per calendar month and expressed as a total over a solar year. Seasonal presentations were taken from the monthly figures and expressed as a total of seasonal presentations per solar year. The seasons were defined as follows: winter—January to March; spring—April to June; summer—July to September; and autumn—October to December. The admissions for July 1988 were summed with those from August and September 1985 to complete a nominal season.

Lunar relations were determined by comparing the date of admission with the phase of the moon according to the United States Naval Observatory. The four

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lunar phases—new moon, first quarter, full moon, and last quarter—were determined by the date of appearance of that phase plus or minus three days as used by Tasso and Miller.¹⁰ All presentations falling outside these blocks were considered to fall on the cusp of the phase and all patients presenting on those dates were excluded from further lunar analysis. Lunar data were examined in six tranches of six months each (August to January and February to July) and each phase analysed from the overall non-cusp presentations per sample. One hundred and thirty patients presenting with urinary retentions over six months from January to June 1988 in Newcastle upon Tyne were similarly analysed and expressed with reference to the lunar calendar.

All data were compared statistically by using χ^2 analysis of the raw data and comparisons between groups made by using percentage presentations of the whole for each component of the period under review.

Results

In Portsmouth 685 men presented urgently with urinary retention requiring decompression during the period under review. One hundred and eight patients presented in the five months of 1985 studied, 252 and 183 in 1986 and 1987 respectively, and 142 in the seven months to the end of July 1988. This gave a mean of 0.63 patients presenting urgently a day, 4.4 a week, 18.8 a month, and 228.8 a year. There was, however,

TABLE I—Numbers of patients presenting with acute urinary retention in Portsmouth per day. Figures in parentheses are percentages of overall weekly number of presentations

Day	1985	1986	1987	1988	Total
Monday	16 (15)	44 (18)	26 (14)	20 (14)	106
Tuesday	13 (12)	34 (14)	29 (16)	25 (18)	101
Wednesday	19 (18)	42 (17)	20 (11)	15 (11)	96
Thursday	14 (13)	32 (13)	28 (15)	16 (11)	90
Friday	16 (15)	34 (14)	28 (15)	24 (17)	102
Saturday	18 (17)	39 (16)	26 (14)	19 (13)	102
Sunday	12 (11)	27 (11)	26 (14)	23 (16)	88
Total	108	252	183	142	685

TABLE II—Numbers of patients presenting with acute urinary retention in Portsmouth per month. Figures in parentheses are percentages of annual number of presentations

Month	1985	1986	1987	1988	Total
Jan		27 (11)	17 (9)	25 (10)	69 (10)
Feb		20 (8)	15 (8)	17 (7)	52 (8)
Mar		18 (7)	18 (10)	20 (8)	56 (8)
Apr		21 (8)	7 (4)	18 (7)	46 (7)
May		11 (4)	10 (6)	22 (9)	43 (6)
Jun		17 (7)	19 (10)	19 (8)	55 (8)
Jul		24 (10)	15 (8)	21 (9)	60 (9)
Aug	18 (7)	25 (10)	14 (8)		57 (8)
Sep	21 (8)	18 (7)	23 (13)		62 (9)
Oct	18 (7)	21 (8)	11 (6)		50 (7)
Nov	20 (8)	24 (10)	18 (10)		62 (9)
Dec	31 (12)	26 (10)	16 (9)		73 (11)
Total	108	252	183	142	685

TABLE III—Numbers of patients presenting with acute urinary retention in Portsmouth and Newcastle dependent on lunar phase over six months. Figures in parentheses are percentages of non-cusp presentations

Period	New moon	First quarter	Full moon	Last quarter	Cusp	Total
<i>Portsmouth</i>						
Aug 1985-Jan 1986	37 (31)	25 (21)	31 (26)	26 (22)	16	135
Feb-Jul 1986	40 (39)	19 (18)	24 (23)	20 (19)	6	109
Aug 1986-Jan 1987	36 (33)	23 (21)	24 (22)	25 (21)	7	115
Feb-Jul 1987	26 (30)	17 (20)	20 (23)	23 (27)	8	94
Aug 1987-Jan 1988	32 (30)	25 (24)	31 (29)	18 (17)	9	115
Feb-Jul 1988	36 (33)	21 (19)	28 (26)	23 (21)	9	117
Total	207 (33)	130 (21)	158 (25)	135 (21)	55	685
<i>Newcastle</i>						
Jan-June 1988	39 (32)	18 (15)	31 (25)	35 (28)	7	130

considerable annual variation in the numbers of retentions seen (plus or minus 20%), which were significantly lower in 1987 for no apparent reason ($\chi^2=13.5$, $df=2$, $p>0.005$).

There were no significant differences between the day of presentation and the mean over the three years (table I) or between the mean number of presentations a day for each solar year on weekdays (17.8 a day in 1985, 37.0 in 1986, 25.3 in 1987, and 18.5 in 1988) compared with the weekend (16.3 a day in 1985, 32.3 in 1986, 26.3 in 1987, and 22.0 in 1988). The monthly data seemed to show a lower incidence of urinary retention during spring (table II), though there was no significant monthly predominance of this presentation over the three years. Similarly, there seemed to be an increase in the seasonal incidence of retention in autumn, but once again this failed to achieve significance ($\chi^2=5.983$, $df=3$, $p>0.10$).

In the period under review there were 37.33 lunar months (a lunar month is the time from the appearance of one new moon to the appearance of the next and is 29.33 solar days), amounting to 3.1 lunar years (a lunar year=354.33 solar days). Of the total admissions in Portsmouth, 55 fell on the cusp of a phase, leaving 630 patients for comparative analysis. One third of the patients presented during the new moon compared with a fifth for the first quarter, a quarter for the full moon, and just over a fifth for the last quarter (table III). The number of presentations during the phase of the new moon achieved significance at greater than 0.1% ($\chi^2=23.558$, $df=3$, $p<0.001$) by comparison with the other lunar phases. There was no significant incidence of retention during the other lunar phases ($\chi^2=3.14$, $df=2$, $p>0.10$), and the smaller secondary peak observed at the time of the full moon was, again, not significant. A similar pattern of presentations with urinary retention was seen in the smaller number of patients studied in Newcastle (table III), though in this group there was a higher incidence of retention in the last quarter than at the full moon. There seemed to be a significantly lower incidence of retention during the first quarter than during the other phases ($\chi^2=8.079$, $df=3$, $p=<0.05$).

Discussion

The development of symptomatic urinary retention is an important event in the pathophysiology of benign hypertrophic prostatic enlargement, being associated with an increased mortality for those subsequently undergoing an operation to decompress the outflow tract.^{2,3} This complication of prostatic enlargement is extremely difficult to predict from the history alone,¹¹ while more sophisticated investigations, including radiology, uroflometry, and cystometrography, cannot accurately identify men with urological symptoms at risk from this presentation.¹² Powell *et al* suggested, however, that the combination of severe hesitancy and a large residual volume of urine after micturition should indicate some priority for a pre-emptive operation,¹² to which Ball *et al* added the objective dimension of a deteriorating rate of flow of urine.¹¹

A large residence of urine after micturition that may precipitate overdistension of vesicals is supposed to lead to detrusor failure or detrusor decompensation (urinary retention) when voiding is deferred or the renal output is increased in susceptible people.^{12,13} Social factors, such as an increased fluid load consequent on social drinking, have been considered responsible for the development of a decompensated detrusor. We were, however, unable to show an increased incidence of retention at weekends or a considerable increase during the season that includes Christmas, socially the periods of greatest alcohol intake. Similarly, it has been assumed that failing

bladders may be tipped into retention by an increased water load during the cooler months, when fluid losses due to perspiration are at the lowest. Again we were unable to substantiate this fact or any other that might implicate thermoperiodic or photoperiodic phenomena.

What we have shown is a significant incidence of retention during the phase of the new moon, which seems to be independent of the latitudes of the populations studied.¹⁴ This may be due to a physiological tidal wave causing an unaccustomed fluid load to be presented to the bladder. The tidal wave phenomenon has been suggested to be due to the maximal lunar gravitational pull,¹⁵ mediating physiological effects perhaps by the suprachiasmatic nucleus of the hypothalamus.¹⁶ This phenomenon is possibly responsible for biorhythms in humans¹⁵ and may lead to an increased incidence of parturition,⁶ menstruation,⁷ and psychopathic behaviour^{15,17} during the full moon. Others, however, have refuted such lunar associations.^{18,19} Our study is by no means a long term analysis of the correlation between lunar periodicity and detrusor failure, though the relation between retention and the new moon was striking for the periods studied in both centres. Why there should be a higher incidence of urinary retention at this lunar phase is unclear as the gravitational pull on the body's water content is 23% less at this time than at the full moon¹⁵ and should not exert the maximal tidal effect.

We think that our observations indicate that further exploration of lunar periodicity and urinary retention is needed. Should they be verified we believe that the increased workload on a specialist urological practice during the new moon should be taken into account when such a service is being planned. At present we are

unsure whether the relation between the new moon and the urinary tract is a coincidental or simply a lunatic observation.

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Cape Town