UNAI

Urology, Nephrology and Andrology International

Corresponding address
Red Flower Publication Pvt. Ltd.
48/41-42 DSIDC, Pocket-II,
Mayur Vihar Phase-I
Delhi - 110 091(India)
Phone: 91-11-22754205/45796900,
E-mail: info@rfppl.co.in
Web:www.rfppl.co.in

Urology, Nephrology and Andrology International (UNAI) (ISSN: 2456-5016) is a peer-reviewed, print and online journal. Content includes Research Highlights from the current literature, News & Views, thorough Reviews, in-depth Case Studies and Perspectives. The contributors are welcomes globally to contribute their studies on a broad range of topics in urology, nephrology and andrology and its other allied fields.

Subscription Information

India
Institutional (1 year) (Print+Online): INR7000

Rest of the World
Insitutional (1 year) (Print+Online): $500

Payment instructions
Online payment link:
http://rfppl.co.in/payment.php?mid=15

Cheque/DD:
Please send the US dollar check from outside India and INR check from India made. Payable to 'Red Flower Publication Private Limited'. Drawn on Delhi branch

Wire transfer/NEFT/RTGS:
Complete Bank Account No. 604320110000467
Beneficiary Name: Red Flower Publication Pvt. Ltd.
Bank & Branch Name: Bank of India; Mayur Vihar
MICR Code: 110013045
Branch Code: 6043
IFSC Code: BKID0006043 (used for RTGS and NEFT transactions)
Swift Code: BKIDINBBDOS

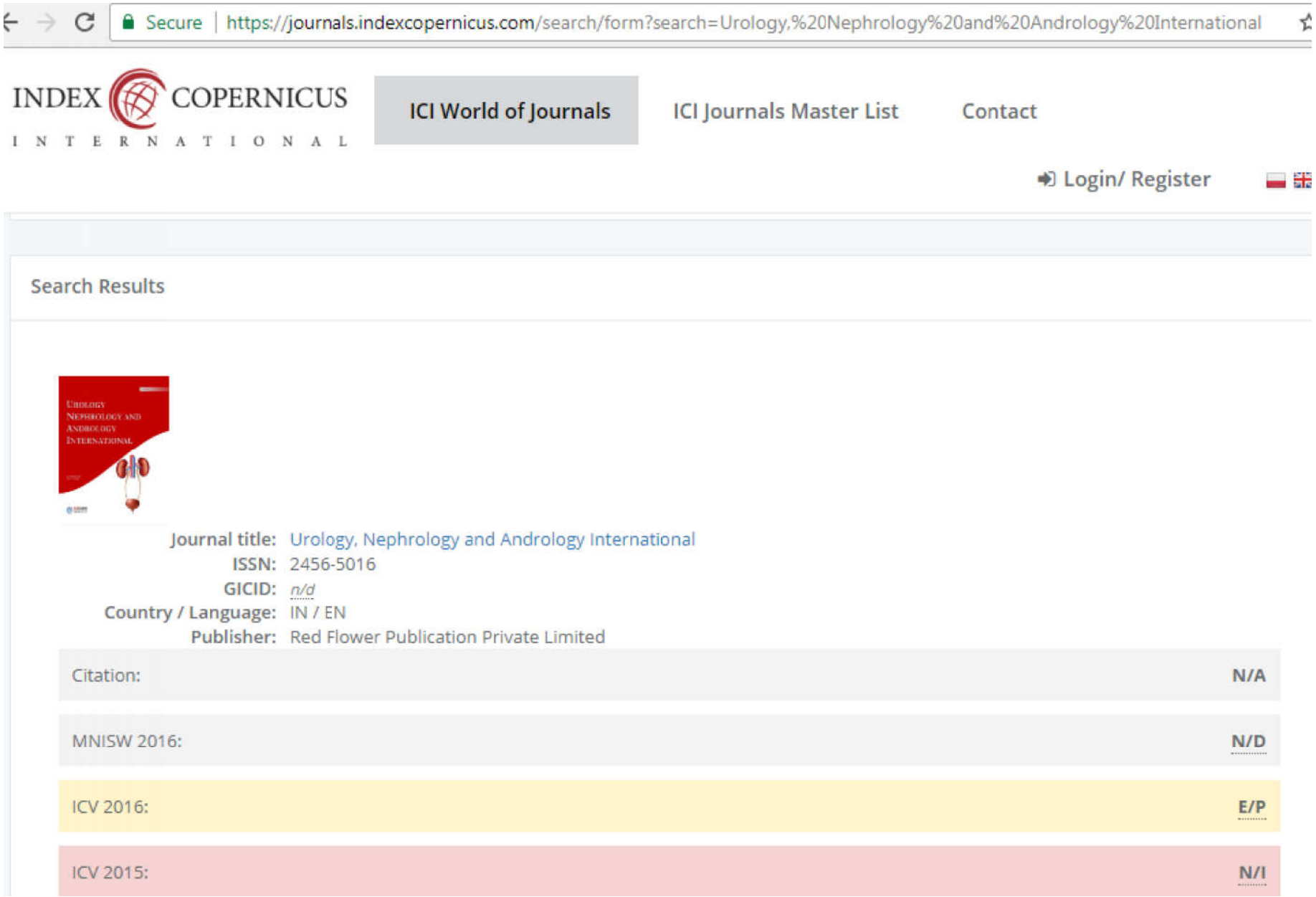
Send all Orders to: Subscription and Marketing Manager, Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091(India), Phone: 91-11-45796900, 22754205, 22756995, E-mail: sales@rfppl.co.in, Website: www.rfppl.co.in

Urology, Nephrology and Andrology International

July - December 2017
Volume 2, Number 2

Contents

Original Articles


Secure | https://journals.indexcopernicus.com/search/form?search=Urology,%20Nephrology%20and%20Andrology%20International
INDEX COPERNICUS INTERNATIONAL
ICI World of Journals
ICI Journals Master List
Contact
Login/ Register
Search Results
Journal title: Urology, Nephrology and Andrology International
ISSN: 2456-5016
GICID: n/d
Country / Language: IN / EN
Publisher: Red Flower Publication Private Limited
Citation: N/A
MNISW 2016: N/D
ICV 2016: E/P
ICV 2015: N/I

Original Article

Urology, Nephrology and Andrology International
Volume 2 Number 2, July - December 2017

Author Affiliation:
[a]Consultant Nephrologist
[c]Medical Transcriptionist
[d]Resident Medical Officer,
Department of Nephrology, EMS Memorial Cooperative Hospital and Research Centre, Perinthalmanna, Malappuram, Kerala 679322, India. [b]Professor, Department of Pathology, Amrita Institute of Medical Sciences and Research Centre, Kochi, Kerala 682041, India.

Reprint Request:
Lakshminarayana G.R.,
Consultant Nephrologist,
Department of Nephrology, EMS Memorial Cooperative Hospital and Research Centre, Perinthalmanna, Malappuram, Kerala 679322, India.
E-mail: drlng23@gmail.com

Received on: 01.01.2018
Accepted on: 18.01.2018

Nondiabetic Renal Disease (NDRD) in Type 2 Diabetes Mellitus (T2DM)

Lakshminarayana G.R.[a], Seethalekshmy N.V.[b], Rasvi P.R.[c], Muthukumar R.[d]

Abstract

Background: The prevalence of nondiabetic renal disease (NDRD) in those with type 2 diabetes mellitus (T2DM) is common worldwide, however, data from India is limited. *Methods:* This study included subjects of T2DM who underwent renal biopsy with suspicion of NDRD from September 2009 to August 2016. *Results:* Seventy-one subjects (males:47 [66.2%] and females:24 [33.8%]) of T2DM with mean age and standard deviation (SD) of 52.93±12.56 years were included in the study. The indications for renal biopsy included acute on chronic renal failure (ACRF) in 35.2% (25), nephrotic syndrome (NS) in 31% (22), acute renal failure (ARF) in 14.1% (10), nephritic syndrome in 14.1% (10) and others in 5.6% (4) of subjects. The prevalence rates of NDRD, diabetic nephropathy (DN) and DN with NDRD were 50.71 (36), 28.16 (20) and 21.13% (15) respectively. Among the subjects with NDRD, 69.44% (25) had primary glomerular diseases (PGDs), 16.67% (6) had tubulointerstitial diseases (TIDs) and 13.89% (5) had secondary glomerular diseases (SGDs). The IgA nephropathy (IgAN) was the commonest of the PGDs affecting 28% (7) followed by post-infective glomerulonephritis (PIGN) in 20% (5), membranous nephropathy (MN) in 16% (4), focal segmental glomerulosclerosis (FSGS) in 12% (3) and miscellaneous lesions in 24% (10). The acute interstitial nephritis (AIN) and primary amyloidosis were the commonest of TIDs and SGDs respectively. Among the patients with combination of DN with NDRD, 53.33% (8) were TIDs and 46.67% (7) had glomerular diseases. The acute tubular injury/necrosis (ATN) and PIGN were the commonest of TIDs and glomerular disease respectively. The figures in brackets representing number of patients. *Conclusions:* Majority of the subjects with T2DM had NDRD either alone or in combination with DN in the study, underlining the utility of renal biopsy for their diagnoses in those with appropriate indication. Wide spectrum of PGDs, TIDs and SGDs were found in the study.

Keywords: Type 2 Diabetes Mellitus; Non-Diabetic Renal Disease; Diabetic Nephropathy.

Introduction

Renal diseases in 95% of patients with type 1 diabetes mellitus (T1DM) for over 10 years in presence of diabetic retinopathy or neuropathy are most likely to be diabetic nephropathy (DN) [1]. However, in T2DM 12-82% of them had renal lesions were due to non-diabetic renal diseases (NDRD) in different series [2-11]. The end stage renal disease in T2DM is due to

NDRD in 40-60% of cases there by stressing the importance of early diagnosis [10]. The markers indicating the presence of NDRD include short duration of DM, unexplained worsening of renal disease, absence of neuropathy, absence of retinopathy and presence of active urinary sediments, or features of other systemic diseases [9-11].

Aims and Objectives

The present study was designed to retrospectively analyze kidney biopsies of patients with DM with the aim to find-out the prevalence of DN, NDRD, and DN plus NDRD.

Meterials and Methods

This is a retrospective study which included all consecutive patients of T2DM who underwent renal biopsies from September 2009 to August 2016, under guidance of ultrasound using Bard® Max-Core® disposable core biopsy instrument, CR Bard Inc., USA. All the biopsies were analyzed by light microscopy using hematoxylin and eosin (H&E), periodic acid Schiff (PAS), Jone's silver methaneamine and Gomori's trichrome stains (MT) and immunofluorescence (IF) studies were performed using anti-human IgG, IgA, IgM, C3, C1q, kappa and lambda light chains. The IF analysis was done using anti-mouse IgG (whole molecule)-FITC (fluorescein isothiocyanate) antibody sourced from goat on frozen sections.

The diagnosis of diabetes mellitus was made according to the criteria stated by the American Diabetes Association. Onset of diabetes was defined as the time when T2DM was first diagnosed. Duration of T2DM was defined as the period between the age of onset and renal biopsy.

The indications for renal biopsy were: acute on chronic renal failure (ACRF), nephrotic syndrome, acute renal failure, nephritic syndrome, rapidly progressive renal failure and subnephrotic protienuria.

The ACRF was diagnosed if, there was a rapid decline of renal function characterized by progressive decline in glomerular filtration rate manifested by increasing serum creatinine or oliguria or need for dialysis in stable case of chronic kidney disease. Patients underwent renal biopsy after exclusion of pre-renal, obvious intra-renal lesions like acute pyelonephrits, accelerated hypertension and post-renal causes for acute worsening of renal function.

Diabetic nephropathy was diagnosed by the presence of mesangial expansion, with or without the nodular Kimmelstiel – Wilson (KW) formation, basement membrane thickening, fibrin caps, or capsular drops and presence of pseudolinear pattern on IF. The NDRDs were diagnosed and categorized as per standard guidelines [12].

The protocol was submitted to the institutional ethical committee and was approved as it was retrospective study without any added cost to the patients or the institution.

The data was analyzed by SPSS 17 for Windows, by SPSS Inc. IL, USA. Two-sided p value of < 0.05 was considered as statistically significant. The observations were analyzed and presented as mean, standard deviation, percentage, and patient number as per relevance. Statistical tests used were Pearson's Chi square test and Fishers Exact test as applicable in analysis. The $p < 0.05$ (2-sided) was considered as statistically significant.

Results

A total 71 patients (Males: 47 [66.2%] and Females: 24 [33.8%], Mean age: 52.93 years) of DM underwent renal biopsy; with a suspicion of non-diabetic renal disease. The demographic data of number of subjects, mean age, gender and duration of T2DM are summarized in Table 1. The prevalence of different histologies are presented as percentages followed by figures in brackets representing number of patients diagnosed with the type of lesion.

The prevalence rates of NDRD, DN and DN with NDRD were 50.71 (36), 28.16 (20) and 21.13% (15) respectively (Figure 1). The mean age, gender, duration of T2DM and number of subjects with DN, DN+NDRD and NDRD, are summarized in Table 2. The mean duration of T2DM were 12.45, 12.13 and 5.33 years in subjects with DN, DN+NDRD and NDRD, respectively. The duration of T2DM in subjects with DN or DN+NDRD was higher than those with NDRD; statistically significant (Pearson Chi-square value: 29.95 & p:0.038). The gender and age of the subjects did not have any statistically effect on renal pathology ($p > 0.05$).

Non-Diabetic Renal Disease (NDRD)

The NDRD was found in 50.71% (36 of 71) of subjects. Among the subjects with NDRD, 69.44% (25) had primary glomerular diseases (PGDs), 16.67% (6) had tubulointerstitial diseases (TIDs) and 13.89% (5) had secondary glomerular diseases

(SGDs). The IgAN was the most common among PGDs affecting 28% (7) of subjects followed by PIGN in 20% (5), MN in 16% (4), FSGS in 12% (3), chronic glomerulonephritis (CGN) in 8% (2), membranoproliferative glomerulonephritis (MPGN) in 8% (2), IgM nephropathy in 4% (1), and minimal change disease (MCD) in 4% (1) (Figure 2). All the cases of PIGN in the study were characterized by low C3 and normal C4 and were secondary to infections.

The acute interstitial nephritis (AIN) was the commonest among TIDs found in 50% (3) subjects followed by chronic tubulointerstitial nephritis (CTIN) in 33.33% (2) and cast nephropathy in 16.67% (1).

The primary amyloidosis was commonest among SGDs affecting 40% (2), followed by non-amyloid deposition disease 20% (1), ANCA related pauci-immune glomerulonephritis in 20 % (1) and anti-glomerular basement membrane (GBM) disease in 20 % (1).

Diabetic Nephropathy (DN)

The isolated diabetic nephropathy was found in 28.16 % (20 of 71) of subjects and was diagnosed by presence characteristics as described in methods.

Diabetic Nephropathy with Associated NDRD

Diabetic nephropathy with associated NDRD was found in 21.13% (15 of 71) subjects of which 53.33% (8) were TIDs and 46.67% (7) had glomerular diseases. The acute tubular injury/necrosis (ATN) was the commonest TIDs affecting 62.5% (5) followed by CTIN in 25% (2) and acute pyelonephritis (APN) 12.5% (1) of subjects (Figure 2). The PIGN was the commonest glomerular disease affecting 57.14% (4) of subjects, followed by IgAN in 14.28% (1) anti-GBM disease in 14.28% (1) and ANCA related pauci-immune glomerulonephritis in 14.28% (1).

Relation of Indication of Renal Biopsy with Histology

The commonest indication for biopsy was acute on chronic renal failure (ACRF) in 35.2% (25) followed by nephrotic syndrome (NS) in 31% (22), acute renal failure (ARF) in 14.1% (10), acute nephritic syndrome (ANS) 14.1% (10), rapidly progressive glomerulonephritis (RPGN) 4.2% (3) and subnephrotic protienuria in 1.4% (1) (Figure 2). The clinical syndromes and histological diagnosis are summarized in Figure 3.

The PIGN was the most common pathology followed by CTIN, IgAN, CGN, AIN, ATN and APN in subjects who underwent renal biopsy for ACRF. The DN was the commonest cause for presentation as NS in T2DM followed by MN, FSGS, amyloidosis, MCD, IgMN, non-amyloid deposition disease. The ATN was commonest cause of ARF followed by AIN, IgAN, MPGN and cast nephropathy. The PIGN and IgAN were the most common causes for ANS followed by MPGN. The ANCA related pauciimmune GN and anti-GBM disease were the causes of RPGN and one subject who underwent biopsy for subnephrotic protienuria had IgAN. The relation of syndromic diagnosis with renal histology was statistically significant (Pearson Chi-square value: 34.27 & $p < 0.01$).

Table 1: The demographic data of subjects with Type 2 diabetes mellitus

Gender	Number of subjects	Age (years) Mean ± Standard Deviation	Duration of DM (years) Mean ± Standard Deviation
Males	47	52.60 ± 11.77	8.92 ± 6.29
Females	24	53.58 ± 14.48	7.78 ± 4.97
Total	71	52.93 ± 12.65	8.53 ± 5.86

Table 2: Relation of renal histology to duration of type 2 diabetes mellitus, age and gender

Histological diagnosis	Gender		Age (Years) Mean ± Standard Deviation	Duration of T2DM (Years) Mean ± Standard Deviation
	Males	Females		
NDRD	21	15	54.47 ± 12.19	5.33 ± 4.07
DN	13	07	52.50 ± 11.10	12.45 ± 6.75
DN+NDRD	13	02	52.53 ± 13.87	12.13 ± 5.40
All subjects	47	24	52.93 ± 12.65	8.77 ± 6.23

NDRD: non-diabetic renal disease
DN: diabetic nephropathy
DN+NDRD: diabetic nephropathy with non-diabetic renal disease

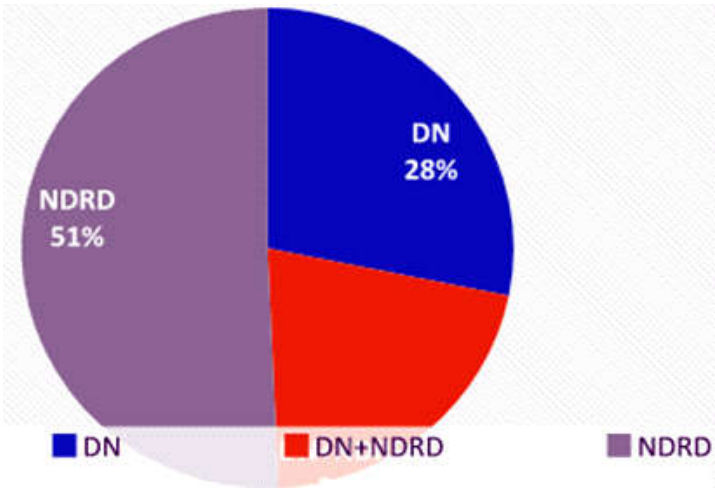


Fig. 1: Broad categorization according to renal histology in subjects with type 2 diabetes mellitus

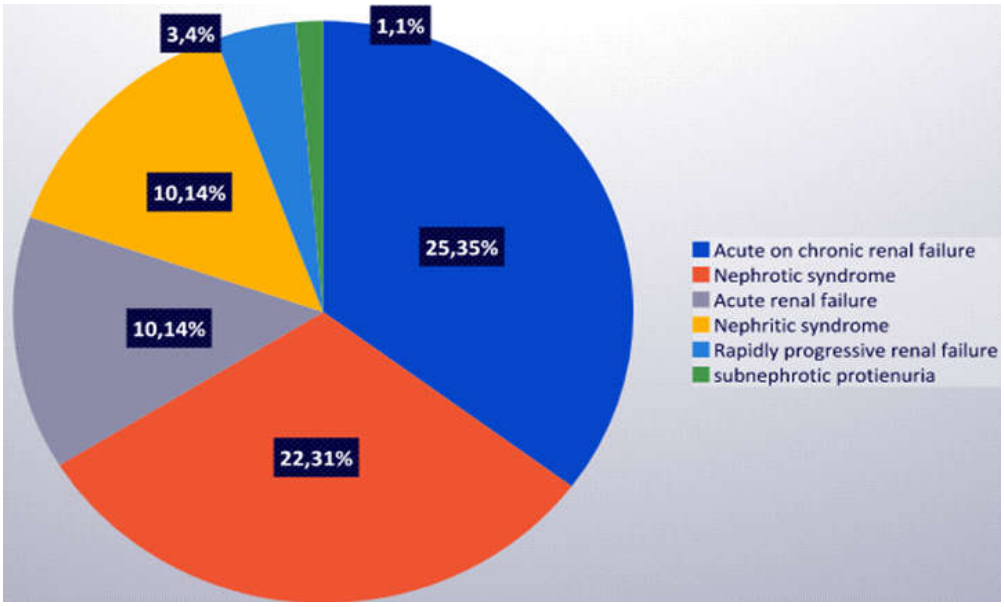


Fig. 2: Indication for renal biopsy (Number of subjects and percentage)

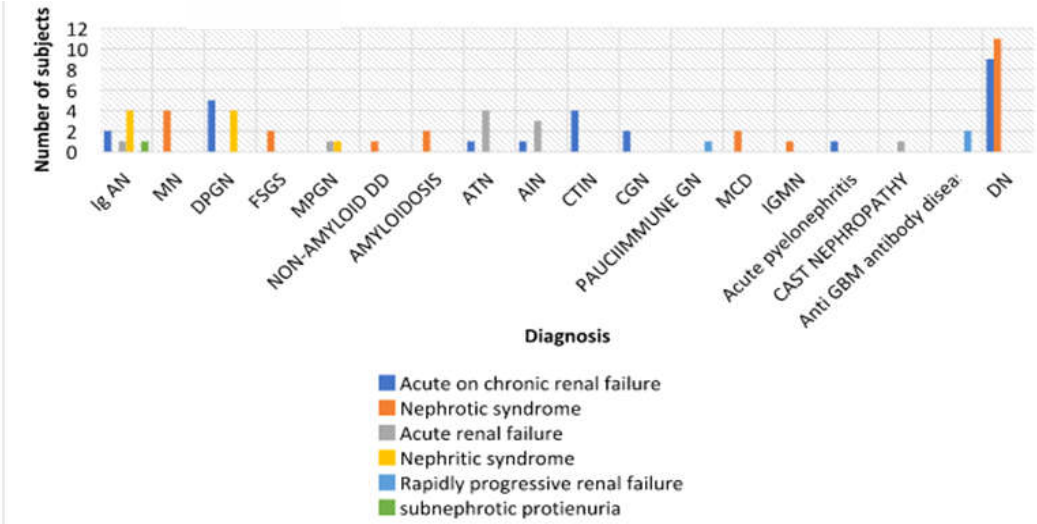


Fig. 3: Relation of indication for renal biopsy with diagnosis

Discussion

The majority of patients whose history and clinical findings are compatible with diabetic kidney disease do not benefit from kidney biopsy, because the diagnosis and treatment is usually not altered [1]. However, renal biopsy is helpful in diagnosis and treatment of NDRD in those with T2DM [2-11]. The clues for NDRD in T2DM are presence of active urinary sediments, low complement levels, sudden deterioration of renal function, nephrotic proteinuria without retinopathy or neuropathy, impaired renal function with normal and/or low grade of proteinuria, absence of retinopathy and short duration of diabetes [9-11].

In the present study, prevalence rates of NDRD, DN and DN with NDRD were 50.71, 28.16 and 21.13 % respectively. Observations our study are similar with earlier reports of renal biopsies in patients with T2DM. The prevalence rates of NDRD, DN and NDRD+ND varied from 24.73 to 82.9%, 6.5 to 66% and 4 to 44.08% respectively, in earlier studies [2-5,7-9]. The variations in percentages is due to heterogeneity of subjects and indications for biopsies. In one study reported from south India, 50% of the subjects had NDRD and remaining had DN [6].

The commonest NDRDs varied in different studies, due to variations in biopsy policies, geographic and ethnic factors. The TIDs were commonest NDRD in two earlier studies [7, 9] and proliferative GN as the most common in one [5] and MN in another study [6].

Primary glomerular diseases (PGDs) were commonest cause for NDRD in the present study, with four most common being, The IgAN, PIGN, MN and FSGS. Almost all types of PGDs have been reported in the literature [2-11]. The FSGS, IgAN, MN, post infectious glomerulonephritis and MCD were the commonest PGDs respectively, in earlier studies [3,4, 6-8].

The primary amyloidosis was commonest SGDs followed by ANCA related pauci-immune glomerulonephritis and non-amyloid deposition disease in present study. Whereas, lupus nephritis was the commonest in an earlier study [8].

Diabetic nephropathy with superimposed NDRD was found in 21.13% subjects, with ATIN and PIGN being the two common associated lesions in the present study. The prevalence of NDRD superimposed on DN was varied widely (4-41%) in earlier studies [3, 7-9]. The IgAN and MN were the most prevalent lesions found in patients with DN in one of the studies [3].

The commonest indication for biopsy in the study was ACRF followed by NS, ARF, ANS, RPGN and subnephrotic protienuria. The reported indications for biopsies in earlier reports were similar to the present study; which included NS, ARF, RPRF, absence of retinopathy, haematuria and ACRF [2, 4,7,8,9].

Limitations

The smaller sample size and absence of electron microscopic evaluation are two major limitations of the study.

Conclusions

The prevalence of NDRD in T2DM is high in our population, especially in subjects who underwent renal biopsy due to presence with atypical features. The prevalence rates of NDRD, DN and NDRD superimposed on DN were 50.71, 28.16 and 21.13% respectively. The NDRDs are the cause NS in up-to 48% of cases. The PGDs were commonest cause for NDRD, followed by TIDs. Among the PGDs the IgAN, PIGN, MN and FSGS were common. The ATN was the commonest TID followed by AIN. The ATN followed by PIGN were the two most NDRD to be associated in those with underlying DN. The mean duration of T2DM was higher in subjects with DN or DN with superimposed NDRD than those with isolated NDRD.

Source(s) of Support: Nil

Conflicts of Interest: Nil

References

1. Mogensen CE, Christensen CK: Predicting diabetic nephropathy in insulin-dependent patients. N Engl J Med 1984;311:89-93.
2. Lai CP, Chang CC, Yang Y, Wen Y K, Chiou PF, Chen M, et al. Non-diabetic renal diseases in type 2 diabetic patients with renal involvement: Clinicopathological study in a single medical center in Taiwan. Acta Nephrologica. 2010;24:157–166.
3. Pham TT, Sim JJ, Kujubu DA, Liu I-LA, Kumar VA. Prevalence of nondiabetic renal disease in diabetic patients. Am J Nephrol. 2007;27:322–328.
4. Li Z, Wenwen R, Wenge L, Guming Z, Jianhua L. Evaluation of renal biopsies in type 2 diabetic

patients with kidney disease: A clinicopathological study of 216 cases. International Urology and Nephrology 2013;45(1):173-179.

5. John GT, Date A, Korula A, Jeyaseelan L, Shastry JC, Jacob CK. Nondiabetic renal disease in Noninsulin- dependent diabetics in a South Indian Hospital. Nephron. 1994;67:441–433.
6. Premalatha G, Vidhya K, Deepa R, Ravikumar R, Mohan V. Prevalence of non-diabetic renal disease in type 2 diabetic patients in a diabetes centre in Southern India. J Assoc Physicians India. 2002;50: 1135–1139.
7. Soni SS, Gowrishankar S, Gopalkrisnan, Kishan AG, Raman A. Non-diabetic renal disease in type 2 diabetes mellitus. Nephrology. 2006;11:533–537.
8. Das U, Dakshinamurty KV, Prayaga V, Uppin MS. Nondiabetic kidney disease in type 2 diabetic patients: A single center experience. Indian J Nephrol. 2012;22(5):358–362. DOI: 10.4103/0971-4065.103912.
9. Devadass CW, Vijaya VM, Raju SV, Mahesh E and Revathi S. Nondiabetic Renal Disease in type 2 Diabetes Mellitus Patients: A Clinicopathological Study. J Lab Physicians. 2013;5(2):94–99, DOI: 10.4103/0974-2727.119850.
10. Prakash J. Non-diabetic renal disease (NDRD) in patients with type 2 diabetes mellitus (Type 2 DM). J HYPERLINK "http://www.ncbi.nlm.nih.gov/pubmed/24475681"AssocHYPERLINK "http://www.ncbi.nlm.nih.gov/pubmed/24475681" Physicians India. 2013;61(3):194-199.
11. Tone A, Shikata K, Matsuda M, Usui H, Okada S, Ogawa D, et al. Clinical features of non-diabetic renal diseases in patients with type 2 diabetes. Diabetes Res Clin Pract. 2005;69:237–242.
12. Hebert L.A, Parikh S, Prosek J, Nadasdy T, Rovin BH. Differential Diagnosis of Glomerular Disease: A Systematic and Inclusive Approach. Am J Nephrol 2013;38:253-266. DOI:10.1159/000354390.

Original Article

Urology, Nephrology and Andrology International
Volume 2 Number 2, July - December 2017

Author Affiliation:
[a,b]Urologist and Assistant Professor [c]Assistant Professor, Department of Surgery, SMBT Institute of Medical Sciences and Research Centre, Nandi Hills, Dhamangaon, Ghoti, Tal-Igatpuri, Distt- Nashik, Maharashtra 422403, India.

Reprint Request:
Nitin Baste,
Assistant Professor, Department of Surgery, SMBT Institute of Medical Sciences and Research Centre, Nandi Hills, Dhamangaon, Ghoti, Tal-Igatpuri, Distt- Nashik, Maharashtra 422403, India.
E-mail: nitinbaste@gmail.com

Received on: 11.11.2017
Accepted on: 23.11.2017

Jack Stone in the Bladder: Is it Really a Rare Entity in Tropical Countries Like India

Sanjay P. Dhangar[a], Parvati Falegaonkar[b], Nitin Baste[c]

Abstract

Vesical calculus accounts for nearly 5% of urinary system calculus. Of these, jackstone constitutes a rare entity. Jackstones are stones that have a specific appearance resembling child's toy. They consist of a dense central core and radiating spicules. Usually described in urinary bladder and rarely upper urinary tract, they are light brown with dark patches and an irregular shape. We here report multiple cases of jackstone from our hospital situated in hilly areas of Nashik district of Maharashtra, India and point out the possible reasons of their higher occurrence inspite of the rarity of the jackstone.

Keywords: Jackstone; Bladder Stone; Vesical Stone; Cystolithotripsy.

Introduction

Calculus disease affects all parts of urinary system-kidneys, ureter, urinary bladder, and urethra. Usually calculus diseases are symptomatic in occurrence but in few cases they can be asymptomatic.Vesical calculus accounts for nearly 5% of urinary system calculus [1] and usually occur because of foreign bodies, obstruction, or infection. Vesical calculi are commonly classified as primary or secondary. Primary vesical calculi are stones which passes from kidney via ureter and lodges in the urinary bladder, while, secondary vesical stones are due to the bladder outlet obstruction, bladder diverticulum, trauma, catheterization, neurogenic bladder, foreign body, etc.

Jackstones are stones that have a specific appearance resembling child's toy. They are almost always composed of calcium oxalate dihydrate, consist of a dense central core and radiating spicules. They are usually light brown with dark patches and are usually described to occur in the urinary bladder and rarely in the upper urinary tract. They grow forming radiating spicules due to deposition of new minerals resulting in irregular shape. These types of stone are commonly described in the veterinary literature with common occurrence in cattle, cats and dogs [2].Their appearance on plain radiographs and computed tomography in human patients has been described.

There are a number of techniques and modalities available to remove bladder stones. Relieving obstruction, eliminating infection, meticulous surgical technique, and accurate diagnosis are essential in their treatment.

Surgical treatment of vesical calculi has evolved over years from "blind" insertion of crushing forceps

into the bladder to open surgical removal, extracorporeal fragmentation, mechanical cystolithotripsy or recently cystolithotripsy with the use of various lasers. Open surgery has been the best-recommended modality for large stones [3]. In small or moderate sized calculi, endosurgical procedures as optical mechanical cystolithotripsy have an added advantage as it can be combined with corrective procedure for bladder outlet obstruction [4].

Materials and Methods

The study was carried out in the Department of Urology and Surgery, SMBT Institute of Medical Sciences and Research Center situated overNandi Hills, at post – Dhamangaon, Taluka - Igatpuri, District – Nashik, Maharashtra in patients with lower urinary tract symptoms between August 2016 and October 2017. This study was approved by the Institutional Review Board of the hospital. A total of 13 patients were found to have jackstone during the study period. Preoperative evaluation included history and physical examination, hemogram, renal function tests, urine culture and sensitivity, X-ray KUB, and ultrasound abdomen. All patients received prophylactic antibiotics 24 hours prior to surgery. Cysto-urethroscopy was performed initially after administering spinal anaesthesia to the patient. Cystoscopy (Karl Storz 30^0 4mm telescope with 20 Fr sheath) was performed to determine the size, number and shape of calculi, and presence of associated pathology. Pneumatic lithoclast was used to fragment the stones in case of endoscopic treatment. Open cystolithotomy was done in cases where the stone size was more than 4 cm or multiple stones when the combined size of all the stones exceeded 5 cm.

Results

Thirteen patients of bladder stone treated between August 2016 and October 2017 were included in the study. Five patients required open surgery, one of which was done on patient's request to retrieve the stone intact, in rest of the cases the stones were large so open cystolithotomy was done. Eight patients underwent cystolithotripsy for their stones. The male to female ratio was 3.3:1. Patients were aged between the age group 42 - 80 years. The mean age was 58.61 years (Table 1).

Bladder outlet obstruction was the primary reason for most of the bladder stones. BEP constituted the major reason in males with 6 patients, stricture urethra came next with 3 patients two males and one female patients respectively. Two patients had meatal stenosis one each male and female. One of the female patient had neurogenic bladder leading to bladder stone. In one patient the stone was primary as he had history of ureteric stone for which he took conservative treatment and later came with a large bladder stone. There was no evidence of bladder outlet obstruction in this patient (Table 1). The mean stone size in open cystolithotomy group was 5.1 cm and 3.37cm in the endoscopic cystolithotripsy group (Table 2).

Operative time was more in cases where open cystolithotomy was done. It was 45-60 minutes for open cystolithotomy and 15–45 minutes for endoscopic cystolithotripsy. Per urethral catheter (PUC) was removed next day in endoscopic cystolithotripsy cases and after seven days in cases of open surgery. No post-operative complications were observed except mild discomfort due to PUC in open surgery cases (Table 2). Complete stone clearance was achieved in all the patients. Stricture

Table 1:

No	Age(years)	Sex(M/F)	Cause
1.	50	F	Neurogenic bladder
2.	54	M	Benign Prostatic Enlargement
3.	49	M	Stricture Urethra
4.	62	M	Benign Prostatic Enlargement
5.	70	M	Benign Prostatic Enlargement
6.	74	M	Benign Prostatic Enlargement
7.	42	M	Stricture Urethra
8.	58	F	Stricture Urethra
9.	57	M	Benign Prostatic Enlargement
10.	63	F	Meatal Stenosis
11.	80	M	Benign Prostatic Enlargement
12.	53	M	Meatal Stenosis
13	50	M	Primary bladder stone

urethra and meatal stenosis patients were advised calibrations according to standard follow-up protocols. CISC was advised for the neurogenic bladder patient. Transurethral resection of prostate was done in all BEP patients.

Table 2:

Stone Size (cm)		Operating Time (minutes)	
Cystolithotomy (Mean = 5.1)	Cystolithotripsy (Mean = 3.375)	Cystolithotomy	Cystolithotripsy
6	3	50	20
5	4	60	30
5	4	45	40
6(multiple)	3.5	50	25
3.5	2.5	45	15
	3.3		30
	4		30
	3.2		25

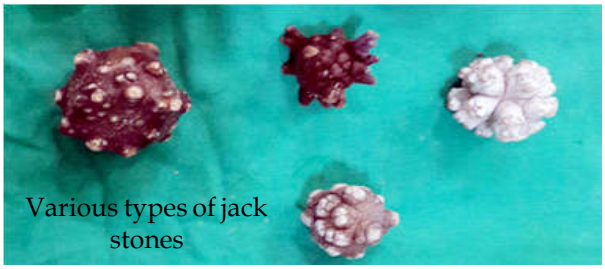


Fig. 1:

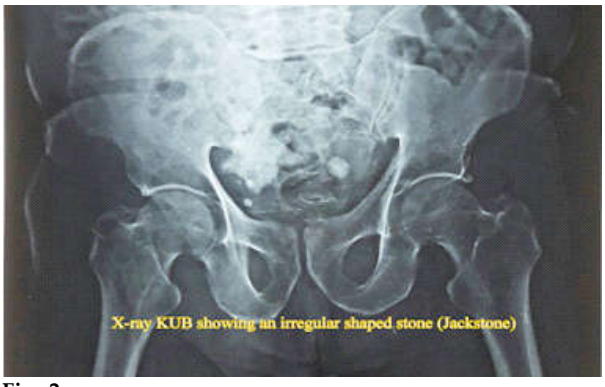


Fig. 2:

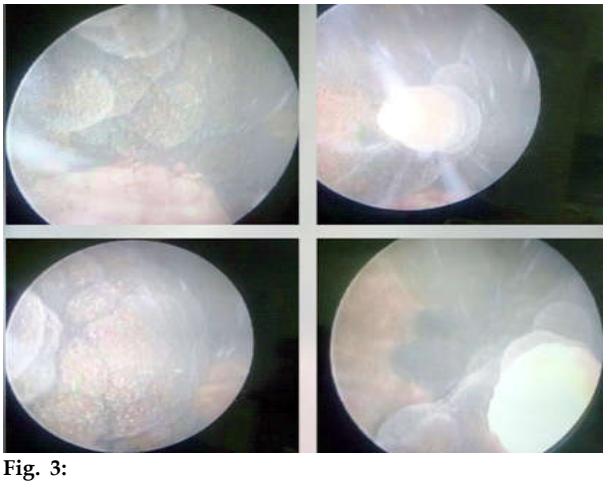


Fig. 3:

Discussion

Vesical calculus usually occurs due to some secondary factors leading to obstruction of the bladder outlet. In few instances, the stone travels from kidney via ureter and gets lodged in the urinary bladder. The stones in the latter situation are known as primary bladder stones. Variety of treatment modalities have been mentioned in literature regarding removal of bladder stone-open surgical, lithotripsy, percutaneous, and transurethral [1,3,4,5,6,7]. All procedures aim to achieve complete stone-free state in shortest possible time, with short hospital stay and minimal complications associated with it.

The present study aimed to notify that, as mentionedin the literature, the jackstones are not so rare. They are still found in the tribal, rural and hilly areas of India specially the Nashik division of the Maharashtra state. Only few case reports have been reported till now [8,9,10].

Jackstone, as the name implies, this variety of stone has a characteristic shape resembling a child's toy. These types of stone are commonly described in the veterinary literature with common occurrence in cattle, cats and dogs. Dogs are mostly commonly affected and canine jackstones are usually composed of silica [2].

Jackstone calculi (Figure 1,2,3) have a characteristic shape that suggests the specific mineral content of these stones. This can have therapeutic implications. Calcium oxalate monohydrate calculi are usually smooth and black, whereas stones comprising calcium oxalate dihydrate tend to be irregular and yellow. Dihydrate stones tend to be fragmented by lithotripsy more easily than monohydrate stones. Jackstone calculi in humans are usually specific for calcium oxalate dihydrate stones [11]. In our study one stone was of silver colour and looked like corals in the sea, as can be seen in the Figure 1.

Bladder outlet obstruction remains the most common cause of bladder calculi in adults. Most common factors predisposing to bladder stone formation are—prostatic diseases, previous lower urinary tract surgery, metabolic abnormalities, upper urinary tract calculi, intravesicular foreign bodies, spinal cord injuries, transplant surgery etc [12]. Stones forming due to the above mentioned factors are usually not jackstones. The presentation of vesical calculi varies from completely asymptomatic to symptoms of suprapubic pain, dysuria, intermittency, frequency, hesitancy, nocturia, and urinary retention. Other common signs include terminal gross hematuria and sudden termination of voiding with some degree of associated pain referred to the tip of the penis, scrotum, perineum, back, or hip. The discomfort may be dull or sharp and is often aggravated by sudden movements and exercise. Assuming a supine, prone, or lateral head-down position may alleviate the pain initiated by the stone impacting the bladder neck by causing it to roll back into the bladder. In our study the bladder outlet obstruction (BOO) is the main cause of this stone. BOO probably restricts the calculus into its eccentric location and contributes to the growth of stone by causing stasis of urine. It is important to recognize the characteristic shape of the jackstones as they are susceptible to lithotripsy.

The reason why we had so many jackstones' patients in our hospital could be many. First among many is the locality of the hospital. It is located in the hilly areas of Nandihills, Dhamangaon, Igatpuri in the holy city of Nashik. Most of the patients come here from hilly, tribal and rural areas. All the patients here are treated free of cost. The urologist is available daily and freely. Patients can come anytime like other medical colleges here, even if the hospital is located in outskirts and hilly region of the city, as there are special transport facility made available and feasible by the local government and the Hospital Authorities. Other reasons why patients came with so big stones and too late for the treatment could be the poor economic condtion, treatment taken from quacks, drinking hard water, etc. Neglecting their own health either due to poor economic status or lack of time or unavailability to accompany someone to go to hospital also gives time for the otherwise small bladder stone to grow and for the classical jackstone.

Conclusion

Jack stones, although rare, are found commonly in the rural, tribal and hilly areas in India. Recognizing the characteristic shape of the jack stoneduring investigation and diagnostic cystoscopy, proper documentation and reporting are important. Identification and treatment of the primary cause of calculi formation is important for improving the patients' symptoms and prevent recurrence.

Financial Support: NIL

Conflicts of Interest: NIL

Bibliography

1. Schwartz BF, Stoller ML. The Vesical calculus. UrolClin North Am 2000;27:333-46.
2. Osborne CA, Clinton CW, Kim KM, Mansfield CF. Etiopathogenesis, clinical manifestations and management of canine silica urolithiasis. Vet Clin North America Small AnimPract. 1986;1:185–2073.
3. Maheshwari PN, Oswal AT, Bansal M. Percutaneous cystolithotomy for vesical calculi: a better approach. Tech Urol 1999;5:40-2.
4. Asci R, Aybek Z, Sarikaya S, Buyukalpelli, Yilmaz AF. The management of vesical calculi with optical mechanical cystolithotripsy and transurethral prostatectomy is it safe and effective? BJU Inter 1999;84:332-6.
5. Zhaowu Z, Xiwen, Fenling Z. Experience with electrohydraulic shockwave lithotripsy in the treatment of vesical calculi. Br J Urol 1988;61:498-500.
6. Ener K, Agras K, Aldemir M, Okulu E, Kayigil O. The randomized comparison of two different endoscopic techniques in the management of large bladder stones: transurethral use of nephroscope or cystoscope?. J Endourol 2009;23:1151-5.
7. Aron M, Goel R, Gautam G, Seth A, Gupta NP. Percutaneous versus transurethral cystolithotripsy and TURP for large prostates and large vesical calculi: refinement of technique and updated data. IntUrolNephrol 2007;39:173-7.
8. Kamal Jeet Singh, AnujTiwari, and AdarshGoyal:Jackstone: A rare entity of vesical calculus:Indian J Urol. 2011 Oct-Dec; 27(4): 543–544.
9. DumindaSubasinghe, SerozshaGoonewardena, and VickneswaranKathiragamathamby: Jack stone in the bladder: case report of a rare entity: BMC Urol. 2017; 17: 40.
10. Perlmutter S, Hsu CT, Villa PA, Katz DS. Sonography of a human jackstone calculus. J Ultrasound Med. 2002;21(9):1047–1051. doi: 10.7863/jum. 2002. 21.9.1047.
11. Dretler S. Stone fragility: A therapeutic distinction. J Urol. 1988;139:1124–7.
12. Douenias R, Rich M, Badlani G, Mazor D, Smith A. Predisposing factors in bladder calculi.Review of 100 cases. Urology. 1991;37:240–3.

Original Article

Urology, Nephrology and Andrology International
Volume 2 Number 2, July - December 2017

Author Affiliation:
[a]Senior Resident [c]Professor & HOD [d]Lecturer, Department of Urology, Institute of Urology, Sakhri Road, Dhule, Maharashtra 424001, India. [b]Resident, Department of Anesthesiology, ACPM Medical College, Dhule, Maharashtra 424002, India.

Reprint Request:
Yaser Ahmad, Junior Resident, Department of Urology, Institute of Urology, Sakhri Road, Dhule, Maharashtra 424001, India.
E-mail: yasserahmad009@gmail.com

Received on: 23.01.2018
Accepted on: 31.01.2018

Study of Correlation of Anatomical Parameters with Clinical Features and Treatment Outcome in Patients of Benign Enlargement of Prostate

Yaser Ahmad[a], Uzma Gulzar[b], Ashish Patil[c], Lokesh Patni[d]

Abstract

Context: Compared to other modalities, the advantage of IPP in assessing BOO may be its easy applicability and non-invasive nature. Therefore, there is a consideration for a larger role of IPP in bedside assessment and management of BOO in daily practice. *Aims:* To Study of correlation of anatomical parameters with clinical features and treatment outcome in patients of benign enlargement of prostate. *Settings and Design:* A hospital based follow up study was carried out at Institute of Urology. *Methods and Material:* Study was carried out among men above 50 years of age with BEP with lower urinary tract symptoms presenting in outpatient department. Out of 106 patients 55 were in Medical treatment group and 51 in Surgical treatment group. Patients were selected for medical and surgical treatment on the basis of IPSS Score, prostate volume, uroflow parameters and patient willingness based on international literature. *Statistical Analysis:* Inferential Statistics "t"- test; ANOVA was used to find the significant difference between continuous outcome variables. *Results:* Significant negative correlation of prostate volume (PV) with peak urinary flow rate (PUFR) and post void residual urine was observed. Significant positive correlation of intra-vesical prostatic protrusion (IPP) with PV was observed, simultaneously significant negative correlation was present between IPP and PUFR. Negative correlation was noted between IPSS score and PUFR, however we found a weak positive correlations of IPSS score with PV and IPP. More significant improvement was noted in patients with IPP > 10 mm and treated surgically. *Conclusion:* Both medical therapy and surgical treatment are effective in management of BEP as they improve the patient's quality of life in terms of improving their PUFR and IPSS Score.

Keywords: Prostate Volume; Correlation; Post Void Residual Urine.

Introduction

Benign prostatic hyperplasia (BPH) is a common entity among elderly men and is responsible for significant disability. The prevalence of histopathological BPH is age dependent, with initial development usually after 40 years of age [1]. The prevalence of histologically diagnosed prostatic hyperplasia increases from 8% in men aged 31 to 40 years, to 40% to 50% in men aged 51 to 60 years, to more than 80% in men older than age 80 years [2].

Men with benign prostatic enlargement (BPE) presumably have an increase in total prostate volume because of BPH [3]. BPE is a common cause of bladder outlet obstruction (BOO) in men older than 50 years presenting with lower urinary tract symptoms (LUTS). BOO is the initial pathophysiological change caused by an enlarged adenoma and is followed by

detrusor over activity or under activity. The degree of BOO is an important factor that can reflect the severity of disease and can aid in choosing a treatment method as well as in measuring the outcome of the treatment [4].

Intra-vesical prostatic protrusion (IPP) has been shown to have a positive predictive value of 72% for BOO. Studies have also shown that men with higher IPP are poorer responders to medical treatment such as α-blockers. Up to 15% to 25% of men aged 50–65 years have lower urinary tract symptoms (LUTS) of sufficient severity to interfere with their quality of life. Although benign prostatic hyperplasia is an important cause of these symptoms, and can have serious consequences, clinicians should be aware of these other causes so that the appropriate diagnosis is made before invasive treatments are started [5].

Treatment strategies include watchful waiting, medical therapy and surgery. Patient selection for the appropriate treatment strategy is paramount in ensuring the best possible outcome. Currently, evaluation and selection criteria for treatment of benign prostatic enlargement include the International Prostate Symptoms Score (IPSS), prostate size, uroflowmetry, post void residual urine (PVR) or urodynamic study and complications due to the disease. However multiple studies reveal negative correlation between symptom severity, uroflow parameters and prostate size. Compared to other modalities, the advantage of IPP in assessing BOO may be its easy applicability and non-invasive nature. Therefore, there is a consideration for a larger role of IPP in bedside assessment and management of BOO in daily practice [6].

It is with this background that an attempt was made to conduct a study on our local population of symptomatic BEP patientswith regards to their clinical features, anatomical parameters, uroflow parameters and treatment outcome.

Materials and Methods

Study Setting

In the Department of Urology at Institute of Urology, Dhule (Maharashtra).

Study Design

Observational follow up study.

Study Duration

February 2014 till February 2016.

Study Population

All men above 50 years of age diagnosed with BEP with lower urinary tract symptoms presenting in outpatient department.

Inclusion Criteria

1. Male patients above 50 years of age diagnosed as symptomatic BEP.
2. Patients with the above condition willing to give written informed consent for study.

Exclusion Criteria

1. Patients with calcular disease, with H/O previous instrumentations, on anti-cholinergic medications, neurogenic bladder, stricture urethra, serum PSA value greater than 4.0 ng/ml, deranged renal function test, urinary tract infections.

Study Sample

Symptom severity, anatomical parameters and treatment outcome of all patients fulfilling inclusion criteria were studied. Total 150 study sample were included in the study by convenient sampling, however 44 were lost to follow up.

Methodology

Ethical clearance from college Institutional Ethics Committee was obtained. The necessary permission to carry out the study was obtained from appropriate authority. The piloting of questionnaire was carried out on 6 study participants with predesigned proforma to check the feasibility and to test the proforma, necessary changes in proforma were made after pilot testing.

The interview technique was used as a tool for data collection. Detailed history of all patients was recorded on special history sheet. Apart from routine investigations, some special investigations were done for diagnosis of BEP as per indicated.

Measurement of LUTS

a. *IPSS Score*

Marathi version of IPSS score was used for assessing the symptom severity of patients in our study population

b. USG Parameters

All patients were subjected to pretreatment transabdominal Ultrasonography (NEMIOXG; model SSA-580A; transducer frequency 5 – 7 mHz)

• *Prostate Volume Estimation*

The prostate ellipse formula (0.523) (transverse diameter) (anteroposterior diameter) (cephalocaudal diameter) was used for prostate volume estimation [7].

• *Intravesical Prostatic Protrusion*

IPP was measured as the length from the tip of the protruding prostate to the base at the circumference of the bladder; it was measured in sagittal plane. Patients were accordingly divided in three groups based on IPP value: group I (5 mm or less); group II (5-10 mm) and group III (more than 10 mm) [8].

c. *Uroflowmetry*

Peak flow and average flow were recorded in all patients. Gravimetric equipment named Urocomp2000E; with wet sensor was used for uroflowmetry. Pre and post treatment peak flow and average flow rates were recorded in all patients.

• *Post Void Residue (PVR)*

Post void residue urine was measured using transabdominal USG immediately following uroflowmetry in both pre and post intervention period.

d. Serum PSA Estimation

Serum PSA estimation was done in all patients (Calbitech, Inc (CBI) PSA ELISA Kit). Patients with serum PSA value greater than 4.0 ng/ml were excluded from our study.

Treatment Modality

Patients were counselled for medical and surgical treatment on the basis of symptom severity, prostate volume, uroflow parameters and patient willingness based on international literature.

a. Medical Management

Patients in medical treatment group were managed with alpha blockers or a combination of alpha blocker with anti-cholinergic medication or alpha blocker with 5 alpha reductase inhibitors.

b. Surgical Management: Bipolar Transurethral resection of the prostate (TURP) was done in surgical group patients (GYRUS ACMI). All surgeries were carried by same surgeon. Catheter free trail was given in all patients after 3 days.

Follow up

Symptom severity score (IPSS) and uroflow parameters were recorded after four weeks of treatment in all patients.

Statistical Methods

The information regarding all the cases was recorded in a master chart. The Statistical analysis was done by using OPEN EPI (Version 3.03a). In Descriptive statistics, the continuous variable was expressed as Mean and Standard deviation. Categorical variables were expressed as frequency and percentage. Inferential Statistics "t"- test; ANOVA was used to find the significant difference between continuous outcome variables Chi- square test and fisher's exact test was used to find out association between the categorical variables. p value < 0.05 was considered as statistically significant.

Results

Table 1 shows pre op Parameters of Study participants. There was no significant difference between the two group patients with regard to age, IPSS score, PV, IPP, PF, AF and PVR. Thus both groups were comparable to each other.

Table 2 shows IPSS score in study participants. Majority (51.8%) of the study subjets had severe IPSS score followed by moderate score among 43.3% of subjects.

Table 3 shows correlation of Prostate volume with PF, PVR, IPP & IPSS. Prostate volume showed positive correlation with PVR, IPP and IPSS score; the correlation with PVR and IPP was significant, however IPSS score was not significantly correlated. Prostate volume was negatively correlated with PF (ml/sec); it was weak but significant correlation.

Table 4 shows correlation of Intravesical protrusion (IPP) with PV, PF, PVR & IPSS score. Intravesical prostatic protrusion showed significant positive correlation with PV and significant negative correlation with PF. However PVR and IPSS score

showed positive but insignificant correlation with IPP.

Table 5 shows correlation of IPSS score with PF, PVR, IPP & PV. IPSS score had weak negative correlation with PF and PVR (statistically non-significant)

Table 6 shows IPSS score in Study participant's before & after medical treatment. The mean value of IPSS Score of patients improved significantly after medical treatment, values improved from 19.3± 3.8 to 12.2 ± 4.2 after treatment ($p < .005$)

Table 7 shows uroflow Parameters in study participants before and after medical treatment. Peak flow, average flow and post void residual (PVR) significantly improved after medical treatment

Table 8 shows IPSS score in Study participant's before & after surgical treatment. The mean values of IPSS Score improved significantly after surgical treatment, the value improved from 22.3±4.8 to 10.8±4.2 after treatment.

Table 9 shows uroflow parameters in study participants before and after surgical treatment. It was observed from above table that the values ofPF, AF and PVRsignificantly improved after surgical treatment.

Table 10 shows association between Intravesical prostatic protrusion and IPSS score among study participants before and after medical treatment. It was observed that IPSS score improved after medical treatment in all the three groups.

Table 11 shows association between Intravesical prostatic protrusion and IPSS score among study participants before and after surgical treatment. IPSS score was significantly different in all the three groups. It was observed that IPSS score improved after surgical treatment in all patients and more significantly in patients with IPP >10 mm.

Table 1: Pre op Parameters of Study participants

Parameter	Total (n:106) (Mean ± SD)	Medical group (n:55) (Mean ± SD)	Surgical group (n:51) (Mean ± SD)	P value (Significance)
Age (years)	65.7 (± 7.1)	66.3 (± 7.3)	65.1 (± 6.4)	0.31 (NS)
IPSS Score	20.0 (± 4.0)	19.5 (± 8.5)	22.1 (± 7.1)	0.09 (NS)
PV (ml)	37.24(± 21.64)	34.29 (± 18.25)	40.43 (± 24.57)	0.13(NS)
IPP (mm)	5.00(± 2.99)	4.17 (± 2.81)	5.77 (± 2.94)	0.08 (NS)
PF (ml/sec)	8.36(± 2.83)	8.93 (± 2.81)	7.74 (± 2.74)	0.02 (S)
AF (ml/sec)	5.54 (± 2.02)	5.94 (± 2.13)	5.15 (± 1.84)	0.06 (NS)
PVR (ml)	54.83(± 38.6)	42.07 (± 22.26)	68.36 (± 47.06)	0.0003 (S)

S:Significant; NS: Non significant; Values are given in the form of Mean (±SD)
Prostate volume = PV; Intravesical prostatic protrusion = IPP; Peak flow = PF; Average flow = AF; Post void residue = PVR.

Table 2: IPSS score in study participants

Parameter*	No. of Study Participants	Percentage
Mild	5	4.7
Moderate	46	43.3
Severe	55	51.8
Total	106	100%

Table 3: Correlation of Prostate volume with PF, PVR, IPP & IPSS

Measurements	Correlation coefficient (r)	r 2	P value	Significance
Peak flow	-0.1715	0.029433	0.0076	Significant
PVR	0.2211	0.048893	0.05	Significant
IPP	0.5214	0.270	0.001	Significant
IPSS Score	0.0870	0.0064	0.2	Non Significant

Table 4: Correlation of Intravesical protrusion (IPP) with PV, PF, PVR & IPSS score

Measurements	Correlation coefficient (r)	r 2	P value	Significance
Prostate volume	0.5532	0.306	0.04	Significant
Peak flow	-0.0901	0.0081	0.007	Significant
PVR	0.1339	0.0169	0.09	Non- Significant
IPSS Score	0.054	0.003	0.58	Non- Significant

Table 5: Correlation of IPSS score with PF, PVR, IPP & PV

Measurements	Correlation coefficient (r)	r 2	P value	Significance
PF (ml/sec)	-0.149	0.022	0.12	NS
PVR (ml)	-0.030	0.001	0.67	NS
IPP	0.016	0.000256	0.45	NS
Prostate Volume	0.087	0.008	0.37	NS

Table 6: IPSS score in Study participant's before & after medical treatment

Parameter*	Before treatment (No. of patients)	After treatment (No. of patients)	P value
Mild	5	28	< 0.05 Significant
Moderate	26	23	
Severe	24	4	
IPPS score (mean ± SD)	19.3 ± 3.8	12.2±4.2	< 0.05 Significant

Table 7: Uroflow Parameters in study participants before and after medical treatment

Parameters	Before treatment (Mean (± SD)	After treatment Mean (± SD)	P value	Significance
		Uroflow parameters		
PF (ml/sec)	8.94 ± 2.81	10.38 ± 2.45	0.001	Significant
AF (ml/sec)	5.94 ± 2.13	7.30 ± 2.20	<0.0001	Significant
PVR (ml)	42.07 ± 22.26	35.37 ± 22.68	0.00021	Significant

Table 8: IPSS score in Study participant's before & after surgical treatment

Parameter*	Before treatment (No. of patients)	After treatment (No. of patients)	P value
Mild	0	39	<0.05 Significant
Moderate	20	11	
Severe	31	1	
IPPS score (mean ± SD)	22.3 ± 4.8	10.8±4.2	<0.05 Significant

Table 9: Uroflow parameters in study participants before and after surgical treatment

Parameters	Before treatment (Mean (± SD)	After treatment Mean (± SD)	P value	Significance
		Uroflow parameters		
PF (ml/sec)	7.74 ± 2.74	13.72 ± 2.93	<0.0001	Significant
AF (ml/sec)	5.15 ± 1.84	10.2 ± 2.81	<0.0001	Significant
PVR (ml)	68.36 ± 47.06	23.93 ± 10.98	<0.0001	Significant

Table 10: Association between Intravesical prostatic protrusion and IPSS score among study participants before and after medical treatment

IPP (mm)	IPSS score (mean ± SD)		P value	Significance
	Before treatment	After treatment		
< 5	19.02 ± 8.7	10.05 ± 5.6	<0.0001	Significant
5-10	16.2 ± 9.7	11.5 ± 7.8	<0.0001	Significant
> 10	22.0 ± 6.6	18.0 ± 0.01	<0.0001	Significant

paired t test

Table 11: Association between Intravesical prostatic protrusion and IPSS score among study participants before and after surgical treatment

IPP (mm)	IPSS score (mean ± SD)		P value	Significance
	Before treatment	After treatment		
< 5	23.3 ±6.7	7.18 ± 4.8	<0.0001	Significant
5-10	20.64 ± 7.3	6.8 ± 5.5	<0.0001	Significant
> 10	27.6 ± 5.85	10.6 ± 8.08	<0.0001	Significant

paired t test

Discussion

We observed correlation of IPSS score, PV, IPP, PF, PVR urine with each other in our study population. Majority of study participants were 65 years and above. Mean age of study participants were 65.7 years. Study done by Berry JS et al [2] reported prevalence of BPH 8% at the fourth decade; however, 50% in the age group of 51-60 years.

Clinical BPH is a highly prevalent disease. By the age of 60 years, nearly 60% of the cohort of the Baltimore Longitudinal Study of Aging had some degree of clinical BPH. In the USA, results of the Olmstead County survey, in a sample of unselected Caucasian men aged 40-79 years, showed that moderate-to-severe symptoms can occur among 13% of men aged 40-49 years and among 28% of those older than 70 years. A multicenter study performed in different countries in Asia showed that the age-specific percentages of men with moderate-to-severe symptoms were higher than those in America. The prevalence increases from 18% for men in their 40s to 56% for those in their 70s. There are considerable differences among countries; these differences may be due to population sample bias or may represent true regional differences [9,10,11].

We observed the mean (SD) value of IPSS Score of the 106 patients was 20±4; with the frequencies of mild, moderate and severe scores as 4.7%, 43.3% and 51.8% respectively.

In a study conducted by Itoh et al [12] on patients with BEP observed frequencies of slight, moderate and severe symptoms as 23.8%, 50.0% and 26.2% respectively.

Average PV was 37.24±21.64 cm^3 measured by USG via trans abdominal route. The prostate ellipse formula was used for prostate volume estimation [7]. The average PV in symptomatic patients of BEP measured by Vesely et al [13] ranged from 40 cm^3 to 60.9 cm^3.

We found that PVRU was 54.83±38.6 ml. Singla et al [14] observed mean PVRU of 117.8 ml with a range of 25-322 ml.

In present study Average IPP among study participants was 5.006±2.99. Puthenveeti et al [15] found that IPP was 5.2±4.5.

In present study mean (SD) peak urinary flow rate (ml/sec) among study participants was 8.36±2.83 ml/sec before treatment. Singla et al [14] studied fifty patients with lower urinary tract symptoms caused by benign prostatic enlargement. In his study he found the mean value of peak flow rate was 10.6 ml/sec with a minimum recording of 3 ml/sec and a maximum recording of 19 ml/s which is more than our study.

In the present study we attempted to observe the correlation of symptom severity score (IPSS score), anatomical parameters (PV and IPP) and uroflow parameter (PFR, PVR urine) with each other. In our study we observed strong positive correlation of prostate volume with post void residual urine, weak positive with IPSS scores, and negative correlation with Peak flow rates. Similar results were observed by Warner Schafer et al [16] they have shown that low peak urine flow rate and high post void residual volume were associated with large prostate volumes.

We observed a significant positive correlation of IPP with prostatic volume and negative correlation with Peak urinary flow. Study done by Chia et al [17] showed similar results, the IPP not only correlated well with BOO (PPV 94%; NPV 79%) but also correlated well with the severity of obstruction as defined by the higher BOO index ($P < 0.001$).

However IPP showed non significant correlation with IPSS and PVR urine. Lieber MM et al [18] in their study also observeda weak correlation of increasing IPP with obstructive symptoms and decreasing peak urinary flow rate. These correlations thus suggest a vital clinical role of intra vesical prostatic protrusion in predicting the needand outcome of treatment.

In present study the IPSS score was negatively correlated with Peak urinary flow rate (ml/sec) and Post void residual urine (ml), however the correlation was non-significant. Puthenveetil et al [15] similarly observed only weak correlation between maximum flow rate and symptom scores. In our study we observed the treatment outcome in both medical and surgical groups in terms of change in symptom severity scores and uroflow parameters.

A significant improvement in mean values of IPSS score and uroflow parameters were observed after medical treatment. IPSS score can be used to monitor changes in symptoms over time or following a conservative or surgical management. IPSS score may be one of the more powerful predictors of symptomatic outcome. Kimio Sugaya et al [19] studied subjects who had LUTS and BPH. IPSS improved in both groups after conservative management.

We observed a significant improvement in symptom severity score, Peak Flow; Average Flow and Post void residual urine was observed. Masanori Yamamoto et al [20] found that surgery was significantly associated with improvement in peak

urinary flow rate, post void residual urine and symptom severity and sexual performance. They concluded that for patients with moderate symptoms of benign prostatic hyperplasia, surgery is more effective in improving genitourinary symptoms and quality of life and suggested medication should be reserved for patients who are less bothered by urinary difficulties or do not want surgery.

We observed a significant improvement in IPSS score in all three groups post intervention. However in patients with IPP > 10 mm and treated surgically a more significant improvement in IPSS score was observed. Lieber MM et al [18] observed in their studythat men with IPP 10 mm or greater were more than 3 times more likely to be taking LUTS/BPE related medications.

Conclusion

For management of benign enlargement of prostate, we therefore need to look at the whole picture, the adenoma (PV, IPP), the obstruction (Peak flow rate and PVRU), and the symptoms (IPSS). Both medical therapy and surgical treatment are effective in management of benign enlargement of prostate as they improve the patient's quality of life in terms of improving their urine flow rates and symptom severity scores (IPSS Score).

References

1. Patel ND, Parsons JK. Epidemiology and etiology of benign prostatic hyperplasia and bladder outlet obstruction. Indian J Urol 2014;30(2):170-6.
2. Berry SJ, Coffey DS, Walsh PC et al. The development of human benign prostatic hyperplasia with age. J Urol 1984;132(3):474-9.
3. McNeal JE. Origin and evolution of benign prostatic enlargement. Invest Urol 1978;15(4):340-5.
4. Baranowska B. [Physiopathology and treatment of hormonal disorders in prostatic hyperplasia]. Endo lkrynologia Pol 1978;29(6):543-56.
5. Thorpe A, Neal D. Benign prostatic hyperplasia. Lancet 2003;361(9366):1359-67.
6. Garraway W, McKelvie G, Russell E. Impact of previously unrecognized benign prostatic hyperplasia on the daily activities of Br J Urol 1993;43(1):318-23.
7. Bin KS, Cho IC, Min SK. Prostate volume measurement by transrectal ultrasonography: comparison of height obtained by use of transaxial mid-sagittal scanning. Korean J Urol 2014;55(7):470-4.
8. Hirayama K, Masui K, Hamada A et al. Evaluation of intravesical prostatic protrusion as a predictor of dutasteride resistant lower urinary tract symptoms/ benign prostatic enlargement with a high likelihood of surgical intervention. Urol 2015;86(3):565-9.
9. American Urological Association. Guidelines on the management of benign prostatic hyperplasia (BPH). Linthicum, MD: American Urological Association Education and Research, Inc. 2006.
10. Madersbacher S, Alivizatos G, Nordling J et al. EAU 2004 guidelines on assessment, therapy and follow up of men with lower urinary tract symptoms suggestive of benign prostatic obstruction (BPH guidelines). Eur Urol 2004;46(5):547-54.
11. Barry MJ, Girman CJ, O'Leary MP et al. Using repeated measures of symptom score, uroflowmetry and prostate specific antigen in the clinical management of prostate disease. Benign Prostatic Hyperplasia treatment outcomes study. J Urol 1995;153(1):99-103.
12. Itoh H, Kojima M, Okihara K et al. Significant relationship of time dependent uroflometric parameters to lower urinary tract symptoms as measured by the International Prostate Symptom Score. Int J Urol 2006;13(8):1058-65.
13. Vesely S, Knutson T, Damber JE et al. Relationship between age, prostate volume, prostate specific antigen, symptom score and uroflometry in men with lower urinary tract symptoms. Scand J Urol Nephrol 2003;37(4):322-8.
14. Single S, Garg R, Singla A et al. Experience with uroflometry in evaluation of lower urinary tract symptoms in patients with benign prostatic hyperplasia. J Clin Diagn Res 2014;8(4):NC01-3.
15. Puthenveetil TR, Baishya D, Barua S et al. Implicaiton of ultrasound bladder parameters on treatment response in patients with benign prostatic hyperplasia under medical management. Asian J Urol 2015;2(4):233-7.
16. Schafer W, Abrams P, Liao L et al. Good urodynamic practices: uroflowmetry, filling cystometry and pressure flow studies. Neurourol Urodyn 2002;21(3): 261-74.
17. Chia SJ, Heng CT, Chan SP et al. Correlation of intravesical prostatic protrusion with bladder outlet obstruction. BJU Int 2003;91(4):371-4.
18. Lieber MM, Jacobson DJ, McGree ME et al. Intravesical prostatic protrusion in men in Olmsted County, Minnesota. J Urol 2009;182(6):2819-24.
19. Sugaya K, Nishijima S, Kadekawa K et al. Relationship between lower urinary tract symptoms and urinary ATP in patients with benign prostatic hyperplasia or overactive bladder.BiomedRes 2009;30(5):287-94.
20. Yamamoto M, Hibi H, Miyake K. A comparison of transurethral resection of the prostate and medical treatment for the patient with moderate symptoms of benign prostatic hyperplasia. Nagoya J Med Sci 1996;59(11):11-6.

Revised Rates for 2018 (Institutional)

Title	Frequency	Rate (Rs): India		Rate ($):ROW	
Community and Public Health Nursing	Triannual	5500	5000	430	391
Dermatology International	Semiannual	5500	5000	430	391
Gastroenterology International	Semiannual	6000	5500	469	430
Indian Journal of Agriculture Business	Semiannual	5500	5000	413	375
Indian Journal of Anatomy	Bi-monthly	8500	8000	664	625
Indian Journal of Ancient Medicine and Yoga	Quarterly	8000	7500	625	586
Indian Journal of Anesthesia and Analgesia	Monthly	7500	7000	586	547
Indian Journal of Biology	Semiannual	5500	5000	430	391
Indian Journal of Cancer Education and Research	Semiannual	9000	8500	703	664
Indian Journal of Communicable Diseases	Semiannual	8500	8000	664	625
Indian Journal of Dental Education	Quarterly	5500	5000	430	391
Indian Journal of Emergency Medicine	Quarterly	12500	12000	977	938
Indian Journal of Forensic Medicine and Pathology	Quarterly	16000	15500	1250	1211
Indian Journal of Forensic Odontology	Semiannual	5500	5000	430	391
Indian Journal of Genetics and Molecular Research	Semiannual	7000	6500	547	508
Indian Journal of Hospital Administration	Semiannual	7000	6500	547	508
Indian Journal of Hospital Infection	Semiannual	12500	12000	938	901
Indian Journal of Law and Human Behavior	Semiannual	6000	5500	469	430
Indian Journal of Legal Medicine	Semiannual				
Indian Journal of Library and Information Science	Triannual	9500	9000	742	703
Indian Journal of Maternal-Fetal & Neonatal Medicine	Semiannual	9500	9000	742	703
Indian Journal of Medical & Health Sciences	Semiannual	7000	6500	547	508
Indian Journal of Obstetrics and Gynecology	Bi-monthly	9500	9000	742	703
Indian Journal of Pathology: Research and Practice	Monthly	12000	11500	938	898
Indian Journal of Plant and Soil	Semiannual	65500	65000	5117	5078
Indian Journal of Preventive Medicine	Semiannual	7000	6500	547	508
Indian Journal of Research in Anthropology	Semiannual	12500	12000	977	938
Indian Journal of Surgical Nursing	Triannual	5500	5000	430	391
Indian Journal of Trauma & Emergency Pediatrics	Quarterly	9500	9000	742	703
Indian Journal of Waste Management	Semiannual	9500	8500	742	664
International Journal of Food, Nutrition & Dietetics	Triannual	5500	5000	430	391
International Journal of Neurology and Neurosurgery	Quarterly	10500	10000	820	781
International Journal of Pediatric Nursing	Triannual	5500	5000	430	391
International Journal of Political Science	Semiannual	6000	5500	450	413
International Journal of Practical Nursing	Triannual	5500	5000	430	391
International Physiology	Triannual	7500	7000	586	547
Journal of Animal Feed Science and Technology	Semiannual	78500	78000	6133	6094
Journal of Cardiovascular Medicine and Surgery	Quarterly	10000	9500	781	742
Journal of Forensic Chemistry and Toxicology	Semiannual	9500	9000	742	703
Journal of Geriatric Nursing	Semiannual	5500	5000	430	391
Journal of Global Public Health	Semiannual				
Journal of Microbiology and Related Research	Semiannual	8500	8000	664	625
Journal of Nurse Midwifery and Maternal Health	Triannual	5500	5000	430	391
Journal of Organ Transplantation	Semiannual	26400	25900	2063	2023
Journal of Orthopaedic Education	Triannual	5500	5000	430	391
Journal of Pharmaceutical and Medicinal Chemistry	Semiannual	16500	16000	1289	1250
Journal of Practical Biochemistry and Biophysics	Semiannual	7000	6500	547	508
Journal of Psychiatric Nursing	Triannual	5500	5000	430	391
Journal of Social Welfare and Management	Triannual	7500	7000	586	547
New Indian Journal of Surgery	Bi-monthly	8000	7500	625	586
Ophthalmology and Allied Sciences	Triannual	6000	5500	469	430
Otolaryngology International	Semiannual	5500	5000	430	391
Pediatric Education and Research	Triannual	7500	7000	586	547
Physiotherapy and Occupational Therapy Journal	Quarterly	9000	8500	703	664
RFP Indian Journal of Medical Psychiatry	Semiannual	8000	7500	625	586
Urology, Nephrology and Andrology International	Semiannual	7500	7000	586	547

Terms of Supply:

1. Agency discount 10%. Issues will be sent directly to the end user, otherwise foreign rates will be charged.
2. All back volumes of all journals are available at current rates.
3. All Journals are available free online with print order within the subscription period.
4. All legal disputes subject to Delhi jurisdiction.
5. Cancellations are not accepted orders once processed.
6. Demand draft / cheque should be issued in favour of "Red Flower Publication Pvt. Ltd." payable at Delhi
7. Full pre-payment is required. It can be done through online (http://rfppl.co.in/subscribe.php?mid=7).
8. No claims will be entertained if not reported within 6 months of the publishing date.
9. Orders and payments are to be sent to our office address as given above.
10. Postage & Handling is included in the subscription rates.
11. Subscription period is accepted on calendar year basis (i.e. Jan to Dec). However orders may be placed any time throughout the year.

Order from
Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India), Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205. E-mail: sales@rfppl.co.in, Website: www.rfppl.co.in

Guidelines for Authors

Manuscripts must be prepared in accordance with "Uniform requirements for Manuscripts submitted to Biomedical Journal" developed by international committee of medical Journal Editors.

Types of Manuscripts and Limits

Original articles: Up to 3000 words excluding references and abstract and up to 10 references.

Review articles: Up to 2500 words excluding references and abstract and up to 10 references.

Case reports: Up to 1000 words excluding references and abstract and up to 10 references.

Online Submission of the Manuscripts

Articles can also be submitted online from http://rfppl.co.in/customer_index.php.

I) First Page File: Prepare the title page, covering letter, acknowledgement, etc. using a word processor program. All information which can reveal your identity should be here. use text/rtf/doc/PDF files. Do not zip the files.

2) Article file: The main text of the article, beginning from Abstract till References (including tables) should be in this file. Do not include any information (such as acknowledgement, your name in page headers, etc.) in this file. Use text/rtf/doc/PDF files. Do not zip the files. Limit the file size to 400 Kb. Do not incorporate images in the file. If file size is large, graphs can be submitted as images separately without incorporating them in the article file to reduce the size of the file.

3) Images: Submit good quality color images. Each image should be less than 100 Kb in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to 400 pixels or 3 inches). All image formats (jpeg, tiff, gif, bmp, png, eps etc.) are acceptable; jpeg is most suitable.

Legends: Legends for the figures/images should be included at the end of the article file.

If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks from submission. Hard copies of the images (3 sets), for articles submitted online, should be sent to the journal office at the time of submission of a revised manuscript. Editorial office: Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205, 45796900, 22756995. E-mail: author@rfppl.co.in. Submission page: http://rfppl.co.in/article_submission_system.php?mid=5.

Preparation of the Manuscript

The text of observational and experimental articles should be divided into sections with the headings: Introduction, Methods, Results, Discussion, References, Tables, Figures, Figure legends, and Acknowledgment. Do not make subheadings in these sections.

Title Page

The title page should carry

1) Type of manuscript (e.g. Original article, Review article, Case Report)
2) The title of the article, should be concise and informative;
3) Running title or short title not more than 50 characters;
4) The name by which each contributor is known (Last name, First name and initials of middle name), with his or her highest academic degree(s) and institutional affiliation;
5) The name of the department(s) and institution(s) to which the work should be attributed;
6) The name, address, phone numbers, facsimile numbers and e-mail address of the contributor responsible for correspondence about the manuscript; should be mentoined.
7) The total number of pages, total number of photographs and word counts separately for abstract and for the text (excluding the references and abstract);
8) Source(s) of support in the form of grants, equipment, drugs, or all of these;
9) Acknowledgement, if any; and
l0) If the manuscript was presented as part at a meeting, the organization, place, and exact date on which it was read.

Abstract Page

The second page should carry the full title of the manuscript and an abstract (of no more than 150 words for case reports, brief reports and 250 words for original articles). The abstract should be structured and state the Context (Background), Aims, Settings and Design, Methods and Materials, Statistical analysis used, Results and Conclusions. Below the abstract should provide 3 to 10 keywords.

Introduction

State the background of the study and purpose of the study and summarize the rationale for the study or observation.

Methods

The methods section should include only information that was available at the time the plan or protocol for the study was written such as study approach, design, type of sample, sample size, sampling technique, setting of the study, description of data collection tools and methods; all information obtained during the conduct of the study belongs in the Results section.

Reports of randomized clinical trials should be based on the CONSORT Statement (http://www.consort-statement. org). When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma.net/e/policy/l 7-c_e.html).

Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. Extra or supplementary materials and technical details can be placed in an appendix where it will be accessible but will not interrupt the flow of the text; alternatively, it can be published only in the electronic version of the journal.

Discussion

Include summary of key findings (primary outcome measures, secondary outcome measures, results as they relate to a prior hypothesis); Strengths and limitations of the study (study question, study design, data collection, analysis and interpretation); Interpretation and implications in the context of the totality of evidence (is there a systematic review to refer to, if not, could one be reasonably done here and now?, What this study adds to the available evidence, effects on patient care and health policy, possible mechanisms)? Controversies raised by this study; and Future research directions (for this particular research collaboration, underlying mechanisms, clinical research). Do not repeat in detail data or other material given in the Introduction or the Results section.

References

List references in alphabetical order. Each listed reference should be cited in text (not in alphabetic order), and each text citation should be listed in the References section. Identify references in text, tables, and legends by Arabic numerals in square bracket (e.g. [10]). Please refer to ICMJE Guidelines (http://www.nlm.nih.gov/bsd/uniform_requirements.html) for more examples.

Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003; 61: 347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997; 195 Suppl 2: 3-9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000; 71: 1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O, Kidd EAM,

editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

More information about other reference types is available at www.nlm.nih.gov/bsd/uniform_requirements.html, but observes some minor deviations (no full stop after journal title, no issue or date after volume, etc).

Tables

Tables should be self-explanatory and should not duplicate textual material.

Tables with more than 10 columns and 25 rows are not acceptable.

Table numbers should be in Arabic numerals, consecutively in the order of their first citation in the text and supply a brief title for each.

Explain in footnotes all non-standard abbreviations that are used in each table.

For footnotes use the following symbols, in this sequence: *, ¶, †, ‡‡,

Illustrations (Figures)

Graphics files are welcome if supplied as Tiff, EPS, or PowerPoint files of minimum 1200x1600 pixel size. The minimum line weight for line art is 0.5 point for optimal printing.

When possible, please place symbol legends below the figure instead of to the side.

Original color figures can be printed in color at the editor's and publisher's discretion provided the author agrees to pay.

Type or print out legends (maximum 40 words, excluding the credit line) for illustrations using double spacing, with Arabic numerals corresponding to the illustrations.

Sending a revised manuscript

While submitting a revised manuscript, contributors are requested to include, along with single copy of the final revised manuscript, a photocopy of the revised manuscript with the changes underlined in red and copy of the comments with the point to point clarification to each comment. The manuscript number should be written on each of these documents. If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks of submission. Hard copies of images should be sent to the office of the journal. There is no need to send printed manuscript for articles submitted online.

Reprints

Journal provides no free printed reprints, however a author copy is sent to the main author and additional copies are available on payment (ask to the journal office).

Copyrights

Declaration

A declaration should be submitted stating that the manuscript represents valid work and that neither this manuscript nor one with substantially similar content under the present authorship has been published or is being considered for publication elsewhere and the authorship of this article will not be contested by any one whose name (s) is/are not listed here, and that the order of authorship as placed in the manuscript is final and accepted by the co-authors. Declarations should be signed by all the authors in the order in which they are mentioned in the original manuscript. Matters appearing in the Journal are covered by copyright but no objection will be made to their reproduction provided permission is obtained from the Editor prior to publication and due acknowledgment of the source is made.

Abbreviations

Standard abbreviations should be used and be spelt out when first used in the text. Abbreviations should not be used in the title or abstract.

Checklist

- Manuscript Title
- Covering letter: Signed by all contributors
- Previous publication/ presentations mentioned, Source of funding mentioned
- Conflicts of interest disclosed

Authors

- Middle name initials provided.
- Author for correspondence, with e-mail address provided.
- Number of contributors restricted as per the instructions.
- Identity not revealed in paper except title page (e.g.name of the institute in Methods, citing previous study as 'our study')

Presentation and Format

- Double spacing
- Margins 2.5 cm from all four sides
- Title page contains all the desired information. Running title provided (not more than 50 characters)
- Abstract page contains the full title of the manuscript
- Abstract provided: Structured abstract provided for an original article.
- Key words provided (three or more)
- Introduction of 75-100 words
- Headings in title case (not ALL CAPITALS). References cited in square brackets
- References according to the journal's instructions

Language and grammar

- Uniformly American English
- Abbreviations spelt out in full for the first time. Numerals from 1 to l0 spelt out
- Numerals at the beginning of the sentence spelt out

Tables and figures

- No repetition of data in tables and graphs and in text.
- Actual numbers from which graphs drawn, provided.
- Figures necessary and of good quality (color)
- Table and figure numbers in Arabic letters (not Roman).
- Labels pasted on back of the photographs (no names written)
- Figure legends provided (not more than 40 words)
- Patients' privacy maintained, (if not permission taken)
- Credit note for borrowed figures/tables provided
- Manuscript provided on a CDROM (with double spacing)

Submitting the Manuscript

- Is the journal editor's contact information current?
- Is the cover letter included with the manuscript? Does the letter:

1. Include the author's postal address, e-mail address, telephone number, and fax number for future correspondence?
2. State that the manuscript is original, not previously published, and not under concurrent consideration elsewhere?
3. Inform the journal editor of the existence of any similar published manuscripts written by the author?
4. Mention any supplemental material you are submitting for the online version of your article. Contributors' Form (to be modified as applicable and one signed copy attached with the manuscript)

Subject Index

Author Index