A SURVEY OF URINALYSIS IN HAZARA POPULATION

Mir Hassan Khan, Mujahid Akbar, Jahangir A. Khan, S. Humayun Shah, and Zakir Ullah

ABSTRACT

Urine of 11600 subjects of Hazara Division were analysed between October, 1989 and November, 1990. Age range was 10-70 years. Physical, chemical and microscopic composition were observed. Most of the samples were pale yellow, had a volume of 1- 1.5 1/24 hrs and few of them were turbid. pH and specific gravity were found in the range of 5-8 and 1.018-1.026 respectively.

369 cases of albuminuria, 205 cases of glycosuria and 93 cases of ketonuria were detected. Jaundice was detected only in few individuals. The abnormal leukocytes, RBC, Epithelial cells, Amorphous urates, Calcium oxalate crystals and Uric acid crystals were found in less than 12% subjects. Different types of casts observed were negligible.

INTRODUCTION

Urine is an aqueous solution of nitrogenous and other solid waste products removed from the blood. The threshold of a given substance in the plasma is the highest level at which the constituent is present in blood before it appears in the urine. The composition of blood plasma is determined by what the kidneys keep rather than by what the mouth ingests. Nutritional value, temperature, composition of the soil and water, and metabolic processes affect the composition of urine[1]. A careful examination of all excreta is used as a basis for estimating the course of disease. Inspection of the urine for diagnostic purposes has been practiced for centuries and probably represents one of the oldest laboratory procedures being used in medicine today.

Much of Bright's work on urinalysis was done by a physician chemist who reported low specific gravity and large amounts of protein in the urine of patients with renal diseases. Urine contains the end products of the metabolic processes of the body. Its analysis provides information not only of renal function but also of many other metabolic activities of the body. The present study was designed to see the urinary abnormalities in Hazara population.

MATERIALS AND METHODS

Specimens of mixed 24 hours' urine of 8430 males and 3170 females were collected from various places in Hazara (Table-1). Sterilized bottles containing Toluol (2 ml/100 ml of urine) as a preservative was used for collection of urine. Each person was physically examined and information regarding age, sex, weight, temperature, general health, dietary habits and history of past illness were recorded on a proforma.

MIR HASSAN KHAN, M.Sc. Research Officer, PMRC Research Centre.
MUJAHID AKBAR, MBBS, M. Phil, Principal, AMC.
JAHANGIR A. KHAN, M.Sc. Ph.D. (UK), Principal Research Officer, PMRC.
S. HUMAYUN SHAH, MBBS, DCP, M. Phil, Associate Professor, Dept., of Pathology.
ZAKIR ULLAH, Ph.D. (UK), Chairman, Dcptt. of Environmental Planning and Management, University of Peshawar.

Urine colour was determined by Vogel's colour scale, volume was measured with graduated cylinder, pH by nitrazinc indicator paper and for estimation of specific gravity Vogel's urinometer was used. Albumin was determined by sulfosalicylic acid test, glucose by Benedict test, bile salts by Hay's test, bile pigments by Harrison's test, Acetone by Legal test and Benzidine test was applied to analyse blood in urine. Microscopic examination was carried out on residual precipitation obtained after centrifuging urine at 3000-4000 rpm for 3-5 minutes.

RESULTS

The result of 11600 urine samples (8430 males and 3170 females) arc given in tables No. 2,3 and 4. Colours observed were pale yellow, yellow, reddish yellow and brownish black. However, pale yellow was dominant about 90%. Most of urine samples had volume 1000 to 1500 ml/24 hrs. pH and specific gravity were found in the range of 5 to 8 and 1.018 to 1.026 respectively. Many of the samples were clear but a few contained turbidity. Of the total samples, abnormal albumin 369, glucose 205, acetone 93, bile salts 187, bile pigments 164 and occult blood 68 were found. The mean abnormal leukocytes 6.3, RBC 6.5, epithelial cells 8.5, amorphous urates 12.2, Cal oxalate crystals 10.3, uric acid crystals 6.3, granular casts 0.13, hyaline casts 0.3 and cellular casts 0.18 per 100 subjects were observed

TABLE-1: DISTRIBUTION OF SUBJECTS

District.	**Male**	**Female**	**Total**
Abbottabad (A)	4150	1680	5830
Mansehra (M)	2800	1028	3828
Kohistan (K)	1480	462	1942
Total	**8430**	**3170**	**11600**

TABLE -2: PHYSICAL EXAMINATION OF URINE

	Male			**Female**		
	A	**M**	**K**	**A**	**M**	**K**
Colour (Pale-Yellow) Volume	88%	88.6%	90.2%	90%	90%	92%
(ml/24 hrs)	1450	1444	1436	1390	1388	1376
Mean pH (6.5)	80%	75%	60%	78%	76%	58%
Mean Sp. gravity	1.025	1.024	1.022	1.024	1.024	1.020
Turbidity	10%	11%	13%	11%	13%	15%

TABLE 3: ABNORMAL CHEMICAL URINARY CONSTITUENTS (%)

	Male			Female		
	A	**M**	**K**	**A**	**M**	**K**
Albumin	3	3.4	3.8	2.5	2.8	3.6
Glucose	2	2.5	2.6	1	1.2	1.3
Acetone	0.8	1.3	0.8	0.6	0.8	0.5
Bile Salts Bile	1.4	1.6	2	1.2	1.5	2
Pigments Occult	1.3	1.4	2	1	1.2	1.6
Blood	0.6	0.6	0.8	0.5	0.6	0.4

Table 4: ABNORMAL MICROSCOPIC EXAMINATION OF URINARY CONSTITUENTS

	Male			Female		
	A	**M**	**K**	**A**	**M**	**K**
Leukocytes%	8	6	6	6	5	7
RBC%	8	7	9	6	4	5
Epithelial cells%	5	4	6	10	12	14
Amorphous urates %	10	11	10	14	12	16
Cal-Oxalates crystals%	8	11	13	8	10	12
Uric acid crystals%	6	5	7	5	7	8
Granular casts%	0.12	0.16	0.17	0.1	0.12	0.13
Hyaline casts%	0.3	0.4	0.4	0.2	0.3	0.4
Cellular casts%	0.2	0.17	0.2	0.18	0.17	0.2

DISCUSSION

The composition of urine varies widely, depending upon the food and fluid intake. Though a large number of serological tests are available for the diagnosis of metabolic changes which occur in different diseases, but urine examination still gives sufficient indication for a disturbance in metabolism or renal dysfunction. Moreover, it is an easy, reliable and a cheap method for providing baseline data and screening of general population.

In our study we found 1.8% cases of glycosuria in this area. A similar observation was made by Shaheen et al. Finding of glucose in urine is not a diagnosis of diabetes mellitus. Further investigations like blood glucose level, Glucose Tolerance test (GTT) arc required to confirm diabetes or renal glycosuria. Finding of albuminuria in 369 cases indicates that renal dysfunction is common in our population. In normal adults an upper limit of 150 mg of protein excreted per day has been reported. Urine albumin has the same immunologic and ultra-centrifugal properties as plasma albumin.[7] However, alpha- 1 and alpha-2 globulins are predominant and beta and gamma globulins are low in urinary proteins. The casts in few samples indicate a renal dysfunction and are

usually associated with albuminuria.

Albuminuria, granular casts and cellularity of the glomeruli is the basis for diagnosis for nephritis. Cellularity of glomeruli can only be seen on smears after biopsy or needle aspiration but albuminuria and casts can easily be detected on microscopy of urinary deposit and is sufficient for diagnosis of nephritis. Few cases observed of albuminuria and granular casts on microscopy indicates the unawareness of people about their health. Our study showed 93 cases of ketonuria. Out of these 87 cases had also glycosuria and history of juvenile diabetes. This indicates the importance of ketonuria for differentiation of insulin dependent diabetes mellitus (IDDM) from non-insulin dependent diabetes mellitus (NIDDM). In ketonuria 20% acetoacetic acid, 2% acetone and 78% beta-hydroxyl-butyric acid are present.[9]

Bile salts are usually present alongwith bile pigments in the urine in obstructive jaundice. Examination of bile salts and bile pigments give sufficient information about the liver function. Only 68 urine samples were blood contaminated. Blood is present in the urine due to the disease of kidney or as a result of injury to the urinary tract.

Urinary tract infection (UTI) is a common problem in our population[10] and sufficient number of pyrexia of uncertain origin (PUO) is due to UTI. Finding of leukocytes in urine is more reliable, easy and first step in diagnosis of this infection. Red cells were present in the urine of few males. But in samples from female patients they may be perhaps of menstrual origin. Our finding of crystals alongwith RBC indicates the importance of urinalysis in the investigation of renal and vesical calculi. In such cases radiological examination will confirm the diagnosis. Epithelial cells of squamous type were present in many urine specimens, especially in non-catheter samples from female patients. Crystals were observed in samples of both males and females. Crystalluria, a diagnostic criterion of lithiasis, is also an image of diet and thus can be utilized for the prevention of stone formation. In acidic samples the commonest crystalline deposits to occur were calcium oxalate and uric acid, while phosphates and calcium carbonate were present in alkaline specimens.

COMMENTS

1. Urinalysis is an easy and cheap laboratory lest.
2. It gives sufficient idea about changes in metabolism or renal dysfunction.
3. Finding of urinalysis must be supported by blood chemistry, culture tests and radiological examination.

ACKNOWLEDGEMENT

The authors are thankful to Mr. Rizwanullah, Statistician, PMRC Research Centre, Mr. Jaffar Khan, Bacteriologist, Ayub Medical College, Mr. Gul Hassan, Student Polytechnic College, Abbottabad, Mr. Nasir Khan Assistant Physiotherapist, Social Welfare Department Mansehra, Shamsul Arifin, Physiology Department, Mr. Mohd Afzal Khan, Pathology Department and Mr. Mohammad Iqbal, Stenographer, PMRC for their remarkable help in completion of this project.

REFERENCES

1. Williams, D.L.; Nunn, R.F. and Marks, V. Scientific foundation of clinical Biochemistry Vol. 1 Analytical aspects, 1978
2. Adams, F. The Genuine work of Hippocrates. New York, William Wood and Co; 1886.
3. Keele, K.D. The evolution of clinical methods in medicine. Springfield, Illinois, Charles C Thomas, 1963.
4. Osman, A.A. Original papers of Richard Bright on renal disease. London, Oxford University Press, 1937.
5. Shaheen, P.K. et al. Prevalence of diabetes in general population of District Abbottabad. Sent for publication to PJMR vide letter No. PMRC/4-7/88-89/AMC/721 dated 26th March, 1989.
6. Relman, A.S. and Levinsky, N.G. Clinical examination of renal function. In strauss, M.B; and Welt, L.G.(eds); Diseases of the kidney. Boston, Little Brown and Company,1971.
7. Webb, T; Rose, G. and Sehon, A. II. Biocolloids in normal human urine II. Physicochemical and immunochemical characteristics. Canad. J. Biochem.Physiol, 1958; 36:1167.
8. Boyce, W.H; Gravy, F.K. and Norflet, C.M. Proteins and other biocolloids of urine in health and in calculous disease. J. Clin. Invest 1954; 33:1287
9. Henry, R.J. Clinical Chemistry: Principles and technics, New York Harper and Row, 1964.
10. Loudon, I.S. and Greenhalgh, G.P. Urinary Tract infection in general practice. Lancet, 1962;2:1246.