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## INTRODUCTION

Urine analysis was the first laboratory test performed in medicine and has been used for several thousand years. Today it continues to be a powerful tool in obtaining crucial information for diagnostic purposes in medicine.<sup>1</sup>

In the 17<sup>th</sup> and the 18<sup>th</sup> century several authors performed urine microscopy, but in the 19<sup>th</sup> century, however the urine microscopy began to be used systematically and further advanced continued.<sup>2</sup>

Light microscopy was done initially for urine analysis. Later on with the discovery of phase contrast microscopy it was found to be useful in urine analysis. Phase contrast microscopy is an optical microscopy technique that converts, phase shifts in the light passing through a transparent specimen to brightness changes in the image phase shifts themselves are invisible but become visible when shown as brightness

## HAEMATURIA;

### PHASE CONTRAST MICROSCOPIC EXAMINATION OF 100 CASES FOR LOCALIZATION OF SOURCE OF BLEEDING

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**ABSTRACT... Introduction:** Urine analysis was the first laboratory test performed in medicine and has been used for several thousand years. Today it continues to be a powerful tool in obtaining crucial information for diagnostic purposes in medicine.<sup>1</sup> **Aims and Objectives:** To estimate the source of bleeding by erythrocyte morphology on PCM, in patients with haematuria. **Study Design:** Descriptive. **Setting:** The Nephrology and Urology out Patients. **Period:** 2014 to 2015. **Methods:** Urinary samples were collected from 100 random patients who presented with haematuria. Samples were examined by face contrast microscope. Urine RBCs were identified as isomorphic and dysmorphic, proportion was taken, >20% of either cells were used for localizing the source of bleeding. Later on, finding was further confirmed by ultra sound or other investigations like renal Biopsies and cell cytology. **Result:** In our study we found that not only the correct bleeding site can be located with a high specificity, but also additional findings can be looked for with a little background knowledge of patient's medical history. **Conclusion:** Phase contrast microscopy should be used by the clinicians for gathering the primitive information in the patients with haematuria.

**Key words:** Phase contrast microscopy, Urine DR, Hematuria

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variations. PCM was invented in 1930 by Nobel prize winner Fritz Zernike.

## METHODS

Fresh midstream urine samples (15-30ml) were obtained from patients attending the nephrology, urology and medicine clinics.

Patients particular were filled in a Performa already designed for this study. Provisional diagnosis was written on Performa and specific numbers were allotted to patient and the urine sample.

Following the standards of urine microscopic examination.

The microscopic appearance of the urine sample was recorded including clarity, colour and any visible haematuria.

Multistick test papers were used for detecting presence of proteins (albumin) and haemoglobin,

PH and specific gravity were recorded.

For light microscopy urine samples were centrifuged and supernatant fluid was decanted sediment was fixed and slide was checked.

As a final step urine was prepared for PCM as follows. For those samples with gross haematuria, a slide was prepared from one drop, without making the sediment.

In case of microscopic haematuria (suspected cases) the sediment was prepared as for the plain microscopy and slide was prepared. Slides were screened by PCM at low magnification (x128) for RBCs and once found with oil immersion lance was used. Haematuria was considered to be present when one RBC per two high power fields was found.

The morphology was classified mainly as dysmorphic or isomorphic but other rare forms were also documented. Final diagnosis was further confirmed by ultrasound, renal biopsies, cytology, cystoscopy and other investigations as required.

## RESULTS

100 patients were included in the study; from them 100 midstream urine samples were collected all samples were examined by PCM. Age of the patients ranged from 13-84 years with a mean age of 55 years.

58 (84%) 100 patients were females (consisting of 4 sisters from a sickle cell family and one post renal transplant patient. 42 (16%) were males. Overall 6 patients were between the age of 13 – 18 year.

The final diagnosis established in this group of patients was following. 20 patients were diagnosed with calculus disease, 4 with bladder growth, 3 patients from fame family were diagnosed having polycystic kidney disease. 37 patients were having glomerulonephritis. (FSGS (13), lupus nephritis (20), IgA nephropathy (2) membranous GN (2)).

FSGS patients consisted of a family of four sisters among others.

3 patients with snake bite, 1 post-transplant patient, 3 sickle cell patients from the same family. 28 patients with UTI were further divided as 22 with DM, and 8 without DM. UTI patients were further divided as having fungal or bacterial or both organism were seen on C/S of urine samples of these patients. Out of 58 females 18 of reproductive age were also having severe IDA HB < 6.7 gm per/DL. They had an interesting finding of elliptocytes as described in another study conducted in 2011.

Out of 100 patients 17 (14.11%) were having gross hematuria the rest 83 (85.89%) were diagnosed having hematuria on dipstick light microscopy and PCM.

But initially multistix test was performed on all the patients and no false negative results were detected by multistix test. Proteinuria was indicated in a concentration of 0.3 g/l in 68 (85.29%) of the urine samples (42+22+4) 42 were confirmed cases of GNs of 83 patients having confirmed hematuria on PCM (14.71%) the distribution of RBCs was done as dysmorphic or isomorphic on the bases of morphology of cells.

Discussing the details of shapes of cells out of these 100 cases of hematuria, 37 were having glomerulonephritis as were conformed later on by renal biopsy.

	Dysmorphic RBCs	Isomorphic RBCs
GN	>80 %	<20 %
Stone deceases	<20%	>80%
UTi	<10%	>90%
Growth	<30%	>70%
Snare bite	50%	50%
Sickle cells	>60 %	<40%

## DISCUSSION

This study showed that glomerular and non-glomerular bleeding can be differentiated with a high level of accuracy by PCM of urine sample patients with haematuria patients.

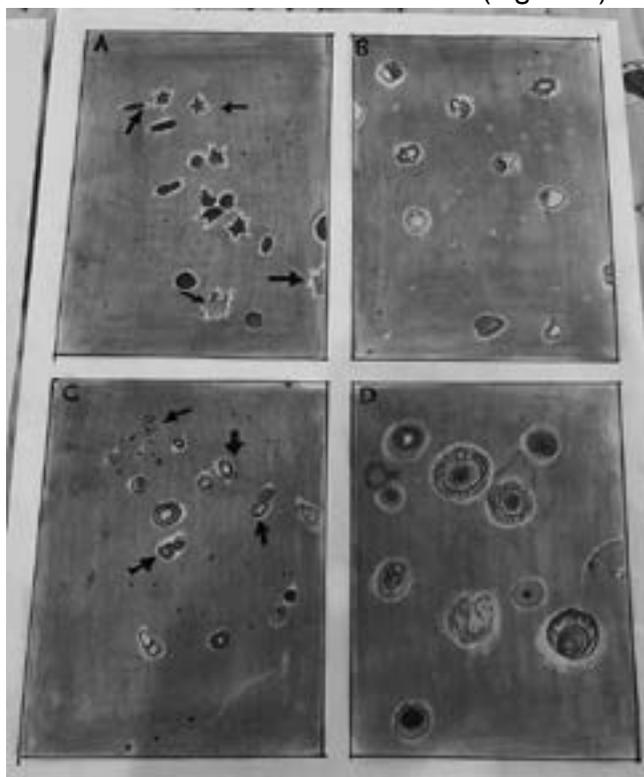
Not only this but PCM can also detect some a typical cell which can be clue to some important early diagnosis as decoy cells in post renal transplant patients.<sup>3</sup>

The result of this study were compared with other studies done on the same topic.

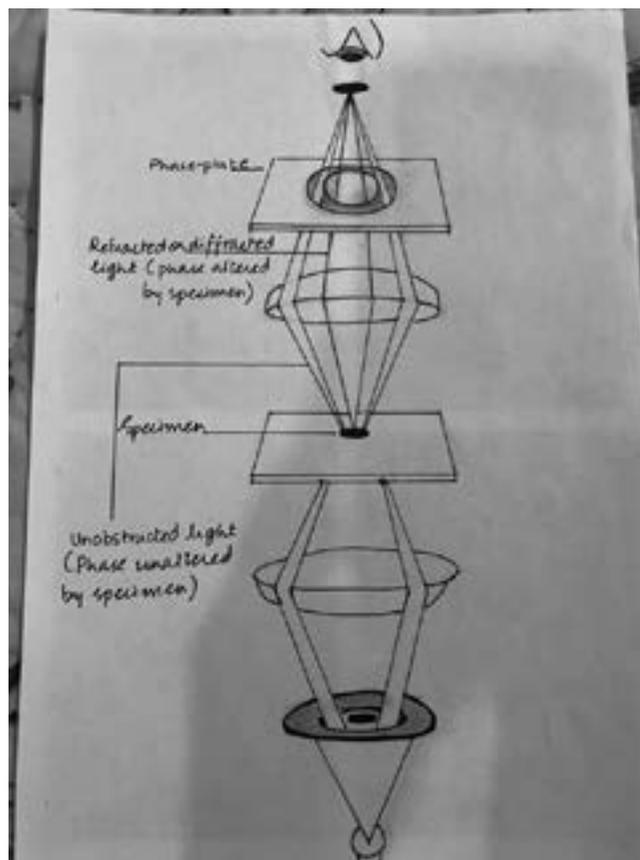
Phase couthers microscopy is without staining is a simple test to screen the urine of the recipient of barhais emphasized. Any kidney unit should have the facility of detecting the decoy cell on PCM in spot urine. The usefulness of phase contrast microscope in urine examination has been emphasized by many studies in past.<sup>4</sup>

Our results of erythrocytes shape based findings are almost the same as found in all the studies done in the past. In this study we tried to find some other shapes of urinary erythrocytes which can be related to other systemic diseases other than renal pathologies as. Since the publication of fairly and birch<sup>5</sup> two main types of urinary erythrocytes were brought to the world of nephology.<sup>6</sup>

Isomorphic RBCs mostly appear as round or biconcave cells with smooth surface (Figure-1).



Dysmorphic RBCs have irregular shape and contour (Figure-2) and a wide morphological spectrum which also includes the cells called acanthocytes.<sup>7,4</sup>



In vast majority of patient's RBC morphology can be categorized as isomorphic or dysmorphic occasionally however other types of RBCs can be found in urine. Based on data available in the literature, these can be categorized as sickle cell, poikilocytes, anisocytes, elliptocytes and dacrococytes.<sup>8</sup>

In over study we could find sickle cell in a sickle cell family on urine microscopy done by PCM as is mentioned in other studies.<sup>9,10,11,12,13</sup>

We could also locate anisocytes and elliptocytes in patients (female with severe iron deficiency anaemia) (HB < 8.0 g/dL) as is mentioned in other studies<sup>14</sup> about G1 cells which are basically the acanthocytes were seen frequently among dysmorphic cells.<sup>15</sup>

G1 cells are doughnut shaped cell with one

or more blebs useful new classification of dysmorphic cells.

In our study cases of were included and identification<sup>16</sup> point of care diagnostic test for childhood urinary tract infection phase contrast microscopy for bacteria stick testing and counting white blood cells

At times with the common and widespread view aA/MUC can also be identified with conditions were methods even though urinary cytology still rephases gold standard over study also included 4 TTC patients with apical cell on patients with alypical cello or PCM which were proved have on by give investigations.<sup>17</sup>

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## AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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2	Abdul Baqi Durrani	Logistic support and help in writing	
3	Alishba Karim	Data collection, hand	