

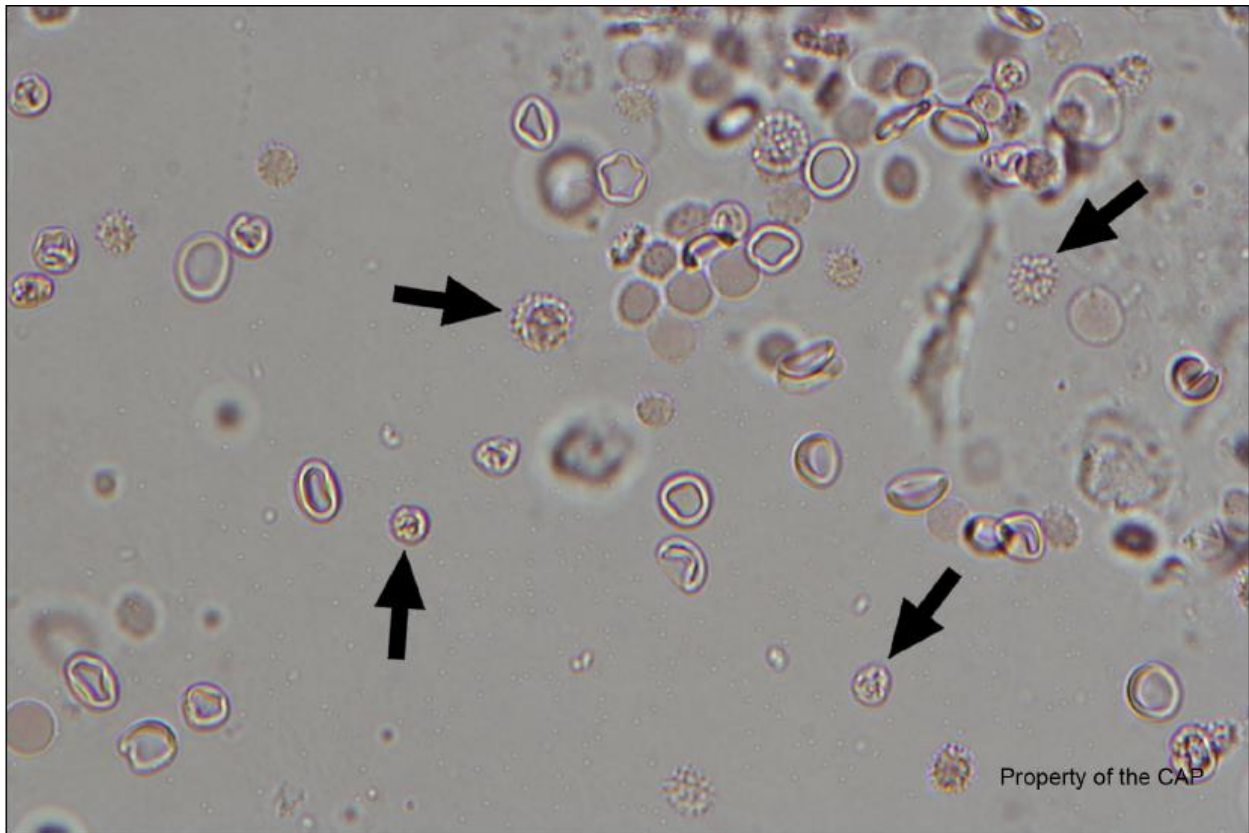
CM-A 2023 EDUCATION

Our lab missed one image on the CM-A 2023 survey. Technically there was no consensus, but since we did not report the intended result, I want to make sure we are all educated on it.

Case History CMP-04 through CMP-06

This urine sample is obtained from a 66-year-old woman with a history of recurrent kidney stones.

Laboratory data include: specific gravity = 1.017; pH = 5.0; glucose, ketone, bilirubin, leukocyte esterase, nitrite, and urobilinogen = negative; protein and blood = positive. Identify the arrowed object(s) on each image.



What would be your best guess?

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Our lab reported these cells as Dysmorphic RBCs (crenated).

25% of referees and 41.5% of participants agreed with us.

The intended result was WBCs.

The reason they gave was that one of the four arrowed cells appears to have a clear nucleus and that these kind of “crenated WBCs” can be seen in a UTI.

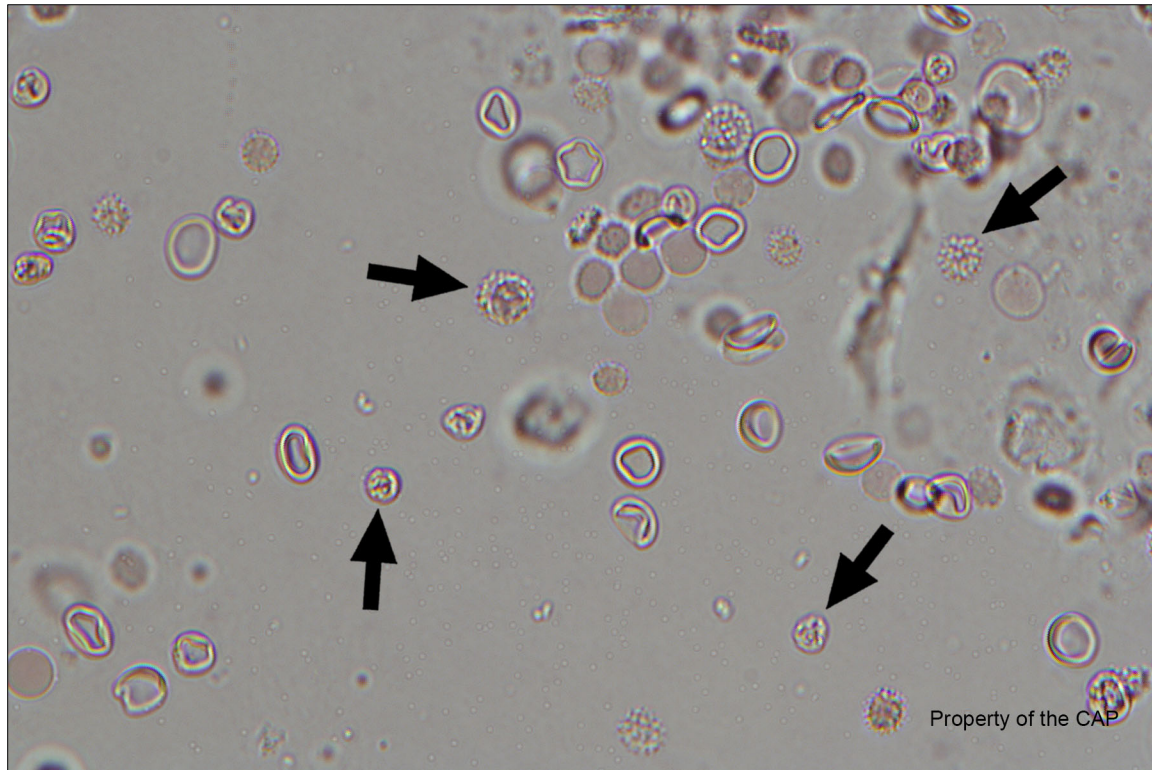
My argument is that the case history does not read like a UTI, and the arrowed cells are even smaller than the normal RBCs. The elevated protein and high/normal pH point more to kidney injury or glomerulonephritis, which would point more towards dysmorphic RBC's.

The takeaway I want all of us to get from this document, however, is that BOTH RBCs and WBCs can be crenated depending on the urine environment. We don't often think of crenated WBCs when reviewing urines. This is why correlation with urine chemistry (dipstick) results AND clinical presentation can be important tools when performing urine microscopic examinations.

The CAP pages from the participant summary follow. Please review and then check the read receipt button.

Urine Sediment Photographs

CMP-05



Identification	Referees		Participants		Evaluation
	Freq	%	Freq	%	
Leukocyte (neutrophil, eosinophil, lymphocyte)	37	71.2	3457	57.3	Non-consensus
Erythrocyte, dysmorphic	7	13.5	1801	29.9	Non-consensus
Erythrocyte	6	11.5	698	11.6	Non-consensus

The arrowed cells are leukocytes, as correctly identified by 71.2% of referees and 57.3% of participants. The white blood cells in this unstained wet preparation are identified as nucleated round cells with the nucleus clearly demarcated in one of the cells. These leukocytes appear shrunken and smaller than expected due to dehydration in hypertonic urine. Many of the leukocytes are shrunken to a degree that obscures nuclear detail, a feature often observed in urine with high specific gravity. Increased numbers of leukocytes in the urine greater than five per high power field (hpf) are a characteristic feature of urinary tract infections (UTI) but other disorders will also cause pyuria. Reflex urine cultures are often used to distinguish between infections and other causes of increased urinary white blood cells.

The arrowed cells were incorrectly identified as dysmorphic erythrocytes by 13.5% of referees and 29.9% of participants. Dysmorphic erythrocytes lack a nucleus, may be smaller than normal erythrocytes and exhibit cytoplasmic bulges or projections that may break off and appear as tiny separate red cell fragments. The classic example of this type of cell is one with two small symmetrically positioned

cytoplasmic blebs (Mickey Mouse ears). These features are not seen in this case. Presence of dysmorphic erythrocytes is considered quite specific for glomerular bleeding, typically glomerulonephritis.

The arrowed cells were incorrectly identified as erythrocytes by 11.5% of referees and 11.6% of participants. Erythrocytes appear as pale, often biconcave, yellow-orange discs. They vary in size but are usually about 7 to 8 μm in diameter. Erythrocytes may become crenated in hypertonic urine and appear as small, shrunken cells with irregular edges and surfaces. The surface crenations may resemble granules, and these cells may be confused with small white blood cells, though crenated RBCs are much smaller than granulocytes and lack a nucleus.