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A TALE OF THREE COLOURED URINES

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ABSTRACT Normal urine is light yellow in colour due to the presence of urochrome.Discolouration of urine to orange,red or brown is common. But blue, green or purple urine is rare. We present three patients of discoloured urine of which one had blue urine due to presence of methylene blue in urine while another had green coloured urine also due to presence of methylene blue but in combination with urochrome third patient had purple coloured urine due to presence of indoles.Although most often benign sometimes coloured urine indicates urinary tract infection or serious metabolic disorder.

KEYWORDS : Blue urine, Green urine, Purple urine.

Introduction:-

Normal urine is light yellow in colour due to the presence of urochrome. Discolouration of urine to orange, red or brown is common.But blue, green or purple coloured urine is rarely seen. Discolouration of urine is distressing for patients, family members as well as health care providers.Although most often benign, sometimes discoloured urine is an indicator of urinary tract infection or serious metabolic disorder. We present three different patients one with blue colour, another with green colour and the third with purple discolouration of urine.

CASE REPORTS:-

Patient no. 1

30- Year old male patient with alleged intake of indigenous plant extract20hours prior as suicidal attempt was admitted. He was drowsy, disoriented, and centrally cyanosed, pupils were normal size, reacting, pulse 114/minute, BP: 60/40 mm Hg: R.R. 36/minute; afebrile, dyspneic; O_2 saturation was 90%. He had tachycardia, lungs were clear,abdomen was soft with no organomegaly, no signs of meningeal irritation and no focal neurological deficit. Blood drawn for routine investigation was muddy coloured and tested positive for methemoglobinemia. CBC – (N); Urea 43mg/dl; serum creatinine 1.1 mg/dl; total bilurubin 1.1mg/dl ; direct : indirect 0.5 : 0.6; AST 35 IU/L; ALT 21 IU/L; alkaline phosphatase 209 U/L; Electrolytes (N); After fluid resuscitation, BP improved to 110/70 mm hg. He was started on an infusion of 1 % methylene blue in normal saline as 1 mg/ kg over ½ hr to correct methemoglobinemia. It was observed that urine turned blue in the urosac bag connected to indwelling catheter due to presence of methylene blue.Complete urine exam not significant except that Sp.gr.1012. He recovered in 2 days from methemog lobinemia and urine colour turned normal after stopping methylene blue and was discharged on 7th day in a stable condition.

Patient no.2

56 year old male, an alcoholic had ingested a pesticide containing alkaloid and lactones 1 day prior to admission.He was cyanosed with altered sensorium although O2 saturation was normal .Blood drawn for investigatioin was dark brown in colour; methemoglobinemia was detected and Bilurubin was 1.8mg/dl direct is to indirect 1:0.8mg/ dl; AST-56 IU/L&ALT-87 IU/L;alkaline phosphatase-240 U/L,Renal Function Test-N, CBC-leucocytosis; Urine pH-7,Sp.gr-1020,no proteinuria. He received IV Methylene blue .His urosac bag contained leafy green urine which turned to light yellow after 2 days after stopping Methylene blue.

Patient no-3: 54 year old female with type 2 Diabetes Mellitus and Chronic Kidney Disease Stage – 3 was on continuous drainage of bladder for Stricture Urethra since 1 year. She noticed purple discoloured urine associated with bad smell of 2 days duration prior to which had taken heavy meet diet in a family function.She was on Premix Insulin, Amlodepine, Atrovastatin and Aspirin, Soda Bicarb tablets and Oral Iron tablets.At presentation her blood pressure was under control,CBC-leucocytosis,Random Blood Sugar was 168 mg/dl,Serum Creatinine was 2.2 mg/dl (eGFR by MDRD formula was 28 ml/min).LFT-Normal.Urine exam showedpyuria and alkaline urine pH 8. Her urine was purple in colour with purple staining of tube and inner surface of Urosac Bag. Urine Culture and Sensitivity showed E.coli, she was initially kept on Inj. Aztrionam and later continued based on sensitivity report. The urine became light coloured after 7 days and totally cleared after 15 days.

DISCUSSION:-

Patient no: 1 & 2 had ingested phenolic compounds which led to methhemoglobinemia for which they received methylene blue. Methylene blue is readily excreted in urine.Blue discolouration of urine is extremely rare because often methylene blue colours urine green as the blue pigment combines with urochrome the yellow pigment and gives green colour.[1,2] In Patient no 1 the urine remained blue as it was dilute urine with low specific gravity of 1.012 whereas patient no .2 had green urine.

Many medications containing phenol group like promethazine, thymol, cimetidine, propofol get conjugated in liver and subsequently excreted in urine colouring it green[3].Also certain non phenol group of drugs like metoclopramide, amitriptylene, indomethacin and antilice agent tetra hydronaphthalene and herbicides like mefenaceta and imazosulfuro also produce green urine[4]Pseudomonas bacteremia due to urinary tract infection and rarely bile in urine due to entero vesical fistula caused by radiation therapy may also produce green urine.In critical care setting patients on enteral tube feeds containing additives may produce blue or green urine.

Blue urine may be due to an autosomal recessive disorder with defect in intestinal tryptophan absorption.The excess tryptophan in gut is metabolized to indole by bacteria, and indican excreted in urine gets oxidised to indigo blue which colours diaper of the affected child blue that is called blue diaper syndrome or Drummonds syndrome[5]

Patient no.3: had purple coloured urine due to presence of indoles. The tryptophan in food is converted by colonic bacteria to indoles which is absorbed into portal circulation and in the liver converted to indoxylsulfate and excreted in urine. In the presence of urinary tract infection (in our case E.coli) it is converted into indoxyl again by action of sulfatase or phosphatase produced by bacteria. This gives rise to indigo a blue pigment and indirubin a red pigment, the mixture of which gives a purple colour to urine.[6] The bacteria that have been reported to be associated with purple urine are Klebsiellapneumonia, Escherichiacoli, Pseudomnasaeruginosa, roteus mirabilis, Proteusrettgeri, Providenciastuartii, Morganellamorganii, Enterobacter species, Enterococcus species and Fecal streptococci.[7]

Purple urine bag syndrome was first described by Barlow and Dickson[8].It is interesting to note that the English King George III had suffered from purple urine bag syndrome.{PUBS}[9].Female gender, old age, cognitive impairment, history of constipation,urinary tract infection, alkaline urine, and the use of plastic urine bag were the risk

factors for PUBS[10].It is important to note that indoles may produce either blue, green or purple urine.depending on concentration and pH of urine.

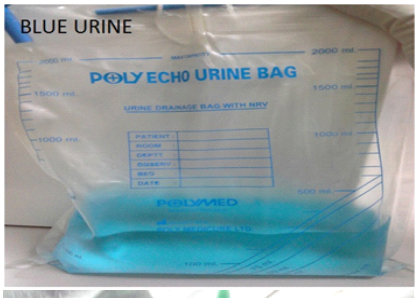
The following table gives conditions where urine colour may be abnormal.

(Adapted from NKFs Primer on kidney diseases) [11]

		Pathological conditions	Colour
I	a).	Gross Hematuria, Hemoglobinuria or Myoglobinuria	Pink, Red, Brown or Black
	b).	Bilirubinuria	Dark Yellow to Brown
	c).	Massive Uric Acid Crystalluria	Pink
	d).	Urinary infection, mainly from Klebsiella spp., Proteus mirabilis, Escherichia coli, ProvvidenciaStuartii, or Enterococcus spp. In patients with permanent bladder catheter	Purple urine, sometimes called " Purple urine bag syndrome"
	e).	Chyluria	Milky white
	g).	Porphyrinuria	Associated with the excretion of porphobilinogen
			burgundy red to black
	h).	Alkaptonuria	Red urine turning Black on standing
	i).	Malignant melanoma with melanuria	Black
II	Drugs	Colour	
	a).	Rifampin	Yellow – Orange to Red
	b).	Desferrioxamine	Pinkish
	c).	Phenytoin, phemothiazines, phenazopyridine	Red
	d).	Chloroquine and Nitrofurantoin, fluorescien	Yellow – Brown
	e).	Triamterene, Propofol and Blue dyes of enteral feeds	Green
	f).	Methylene Blue	Blue or Green
	g).	Metronidazole, Methyldopa and Imipenem – Cilastatin	Darkening on standing to Black Brown
III	Food	Colour	
	a).	Beetroot	Red
	b).	Senna and Rhubarb	Yellow to Brown or Red
	c).	Carotene	Brown

Conclusion:-

Discolouration of urine may be benign and without any consequences but at times may be indicative of urinary tract infection or metabolic disorder.



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