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Case Report

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Purple urine bag syndrome: a perplexing finding in a urethral catheter related urinary tract infection

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Abstract

The appearance of purple coloured urine within the Urethral Catheter-Urine Bag system is often frightening to patients and their relatives and gets health care givers perplexed. The purple colour is said to be a by-product of chemical transformation of indole to indigo or indirubin, or a mixture of the two. Both Indigo and Indirubin are derivatives of colonic bacterial metabolism of dietary Tryptophan using either the Sulphatase or Phosphate enzymes or both. It is seen in chronically ill patients with chronic constipation and on long standing urethral catheterisation. The organisms commonly cultured from such purplish urine are Escherichia coli, proteus mirabilis, klebsiella pneumoniae and Enterobacter species. We reported such a case in a 98-year old paraplegic male patient with a histologically proven metastatic prostate adenocarcinoma and chronic constipation. The urine and catheter tip culture yielded klebsiella specie. We wrote to draw attention to its occurrence and highlight a simple method of its treatment.

Keywords: Urinary Tract Infection, Prolonged Constipation, Indigo, Indirubin, Purple Urine.

Introduction

Purple urine bag syndrome has been reported by many people since it was first highlighted in 1978 [1]. It is a rare phenomenon with an estimated incidence of 9.8%, especially in patients on prolonged urethral catheterisation due to chronic illness or debility [2-4]. It is said to be commonly seen in the elderly female patients with chronic kidney disease, azotaemia, with associated intake of high protein diet [5]. Two very prominent features in most of the reports are the presence of chronic catheterisation and constipation [6-8]. The purple colour of the urine is attributed to the presence of Indigo (blue) and Indirubin (red) pigments [8,10]. Both are derivatives of Indole, generated from colonic bacterial metabolism of dietary Tryptophan [11]. The purple colour is said to be a result of a chemical reaction between the Indigo, Indirubin, and the synthetic materials used in the tubing of the urethral catheter and urine bag [12]. We reported such case in a 98-year old bedridden patient with metastatic prostatic adenocarcinoma.

Case Report

A 98-year old, retired civil servant reported at the general surgery unit of the State Specialist Hospital Potiskum, Yobe state Nigeria with a year long history of recurrent constipation. He opens his bowel after an average of 4-5 days, often after a use of laxatives. There was a preceding history of recurrent voiding and storage lower urinary tract symptoms with intermittent episodes of painless, total haematuria. Digital rectal examination revealed an enlarged prostate with malignant features. A Trucut biopsy of the prostate was done. The result revealed a poorly differentiated adenocarcinoma of the prostate. He had bilateral subcapsular Orchiectomy and is on follow-up with the Urology unit. He developed lower limb weakness 6 months ago. Multiple osteoblastic deposits were noted on the lumbar spine involving the L2-L4 vertebral segments. He has been on urethral catheterisation for more than a year. The urine within the urethral catheter-urine bag system was noticed to have turned purple a week ago with associated suprapubic pain (Figure 1). The urethral catheter was removed, urine sample and catheter tip sent for culture and sensitivity test. Klebsiella pneumoniae was cultured and found to be sensitive to quinolones. Patient was given oral doses of sparfloxacin and the purple colour of the urine waned over a 5-day period. A repeat urine culture done a day after only revealed sterile pyuria, urinalysis showed a pH of 9 and was positive for nitrite.

Discussion

Barlow and Dickson were credited with the first report on Purple Urine Bag Syndrome (PUBS) in 1978 [1]. It was reported as a bizarre manifestation of a Urinary Tract Infection (UTI). It was Dealler and his colleagues that explained the pathophysiology behind the purple colouration of the urine following such UTI [13]. The phenomenon is commonly observed in the elderly institutionalised patients, mostly females, with chronic medical conditions, recurrent constipation and on prolonged urethral catheterisation [14]. The index patient met all the described criteria. He is 98-year old, bedridden due to paraplegia, on a year-long urethral catheterisation, and has a history of chronic constipation. The pathophysiology of PUBS is explained on the basis of

chemical reactions initiated by Bacteria involved in UTI [15]. Although mostly a result of mono-bacterial infection, the isolated organisms are numerous [14]. These include Providencia, Citrobacter, Enterobacter, Klebsiella, Morganella, Staphylococcus and Streptococcus [15]. Others reported are: Serratia marcescens and Pseudomonas aeruginosa [14]. Klebsiella pneumoniae was cultured from the urine and the urethral catheter tip of our patient. Intestinal bacteria like klebsiella is said to metabolise dietary Tryptophan through deamination to produce Indole. The Indole is drained by the Entero-hepatic circulation to the Liver, where it is hydroxylated by hepatic enzymes to Indoxyl sulphate [15]. The Colonic organisms are also capable of catalysing this process [5]. The bacteria implicated in the UTI in these patients are said to rich in Indoxyl sulfatase and phosphatase enzymes and these enzymes convert the Indoxyl sulfate or indoxyl phosphate to Indigo or Indirubin pigments. These pigments produce the purple colouration upon reacting with the polyvinyl chloride in the catheter-urine bag tubing [13]. The purple colour is said to be on the urinary catheter-urine bag system, as physical inspection of a urine sample often shows turbid, yellow urine [13].

Care should be taken while making a diagnosis of PUBS. Certain drugs such as amitriptyline, indomethacin, triamterene, flutamide, phenol and Mitoxantrone and ingestion of berries, fava beans, red beet roots can cause such purplish colouration of the urine [17]. Several reports indicated a tepid course and minimal morbidity following PUBS, as most cases respond to a short course of an appropriately chosen narrow spectrum antibiotic [18]. The prognosis of PUBS is that of UTI, it is only affected by the underlying clinical condition of the patient and age [5]. Generally, PUBS is a benign clinical condition that be managed easily by changing the urinary catheter and urine bag, and use of appropriate antibiotic for the urinary tract infection [14]. Measures that could prevent it will include a good urinary hygiene, prevention and effective treatment of constipation [19].

There are recent reports indicating that PUBS can also be seen in the young, if they have chronic constipation and are on prolonged urethral catheterisation [20].

Conclusion

PUBS although rare, can be frightening to the patient and his care givers. The key to its management is the prompt change the catheter system and deployment of a narrow spectrum antibiotic. All patients are susceptible, irrespective of age, provided are predisposing factors are present.

Conflict Of Interest

None declared.

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None.

Figure 1: Showing the purple coloured urine bag.

References

1. Barlow GB, Dickson JAS (1978) Purple urine bags. The Lancet 311:220-221.
2. Khan F, Chaudhry M, Qureshi N, Cowley B (2011) Purple Urine Bag Syndrome: An Alarming Hue? A Brief Review of the Literature. Int J Nephrol 1022:419213
3. Dealler S, Belshield P, Bedford M, Whitley AJ, Mulley GP (1989) Purple Urine Bags. J Urol 142:769-770.
4. Lin C, Huang H, Chien C, Dong-Sheng Tzeng, For-Wey Lung (2008) Purple Urine Bag Syndrome in Nursing Homes: Ten Elderly Case Reports and a Literature Review. Clin Interv Aging 3:729-734.
5. Pablo Demelo-Rodríguez, Galán-Carrillo, Jorge del Toro-Cervera (2016) Purple urine bag syndrome. Eur J Internal Medicine 35(2016) e3-e4.
6. Mohamed Faisal AH, Shathiskumar G, Nurul Izah A (2015) Purple urine bag syndrome: case report from a nursing resident with a false alarm of urosepsis. Med J Malays 70:265-266.
7. Lin CH, Huang HT, Chien CC, Tzeng DS, Lung FW (2008) Purple urine bag syndrome in nursing homes: ten elderly case reports and a literature review. Clin Interv Aging3:729-734.
8. Agapakis D, Massa E, Hantzis I, Paschoni E, Satsoglou E (2014) Purple urine bag syndrome: a case report of an alarming phenomenon. Hippokratia 18:92-94.
9. Capt. Gary Chow, Katerina Achilleos, Col Hem Goshai (2011) Medicine in Pictures: Purple Urine Bag Syndrome. BJMP 4:1444.
10. Jooyun Lee (2007) Purple Urine. N Engl J Me 357:e14.
11. Bryan P Traynor, Eoghan Pomeroy, Dorothy Niall (2017) Purple urine bag syndrome: a case report and review of the literature. Oxford Medical Case Reports 11:omx059.
12. Pillai BP, Chong VH, Yong AML (2009) Purple urine bag syndrome. Singapore Med J 50(5):e193-e194.
13. Dealler SF, Hawkey PM, Millar MR (1988) Enzymatic degradation of urinary indoxyl sulfate by Providencia stuartii and Klebsiella pneumoniae causes the purple urine bag syndrome. J Clin Microbiol 26:2152-2156.
14. Peng TC, Wang CC, Chan JY (2014) Analysis of risk factors in elderly patients with purple urine bag syndrome: a

retrospective analysis in a medical center in northern Taiwan. J Med Sci 34:110-114.
15. Golzarri MF (2017) Purple urine bag syndrome. Gac Med Mex 153:252-254.
16. Naufal Rizwan TA (2015) Purple Urine Bag Syndrome. J Clinical Diagnostic Res 9(8):OD01-OD02.
17. Agapakis DI, Massa EV, Hantzis I, Paschoni E, Satsoglou E (2014) Purple urine bag syndrome: a case report of an alarming phenomenon. Hippokratia 18:92-94.
18. Delgado G, Martínez-Reséndez M, Camacho-Ortiz A (2014) Purple urine bag syndrome in end-stage chronic kidney disease. J Bras Nefrol 36:542-544.
19. Khan F, Chaudhry MA, Qureshi N (2011) Purple urine bag syndrome: an alarming hue? A brief review of the literature. Int J Nephrol 2011: 419213.
20. Ankita S, Tuphan K D, Prakas K M, Rajib De (2020) Purple Urine Bag Syndrome: A Benign Condition seen in a Young Patient with Haematological Malignancy. Archives of Clinical Medical Case Rep 4:1067-1070.