

1 **URETER KINKED AROUND THE SUPERIOR MESENTERIC VEIN CAUSING**
2 **FEATURES OF PELVIURETERIC JUNCTION OBSTRUCTION: A CASE REPORT**

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4 **ABSTRACT**

5 Pelviureteric junction obstruction (PUJO) is the condition where flow of urine from
6 the renal pelvis to the ureter is hindered due to various intrinsic or extrinsic causes.
7 lower pole renal vessels are mostly associated with this condition. Unlike our case,
8 there have been reports of ureter being kinked around the Veins of Retzius but there
9 has been no case report of ureter being kinked around the superior mesenteric vein
10 directly causing features of PUJO.

11 **KEYWORDS**

12 PUJO; Pyeloplasty; Superior mesenteric vein ; Endopyelotomy; Veins of Retzius.

13 **INTRODUCTION**

14 Pelviureteric junction obstruction (PUJO) is a condition in which the flow of urine
15 from the renal pelvis to ureter is obstructed . This condition is more often seen in
16 children but not rare in adults. The overall incidence of PUJO is between 1 in 1000
17 to 1 in 2000 live births. Antenatal ultrasonogram (USG) of the abdomen can detect
18 this condition in growing foetus.^[1] About 80% of the dilated pelvicalyceal systems in
19 the growing foetuses are due to PUJO.^[2] It is more common in boys and is frequently
20 seen on the left side. The causes of obstruction are classified as intrinsic or extrinsic.
21 They could be primary or secondary. The crossing renal vessels are an important
22 extrinsic cause of PUJO. A crossing aberrant lower pole renal artery is the most
23 common offending vessel.^[2] There has been case reports of ureter being trapped
24 between the vein of Retzius^[3] but to the best of our knowledge there has been no
25 case where the ureter was kinked around the superior mesenteric vein leading to
26 features of PUJO.

27 **CASE REPORT**

28 We present the case of a 23 years old female who has been coming to OPD (out
29 patient department) time and again with right flank pain along with occasional

30 nausea for last one year. No lump was palpable on abdominal examination. Her
31 routine haematological and biochemical investigations were within normal limits.
32 Urine examination showed pus cells and a positive leucocyte esterase. USG showed
33 hydronephrotic right kidney with dilated pelvis . Patient underwent CT urography
34 which revealed hydronephrotic right kidney with dilated PUJ and upper ureter with
35 bilateral normally excreting kidneys(Fig. 1). The patient was taken up for open
36 Anderson Hynes dismembered Pyeloplasty. The right PUJ and upper part of ureter
37 was grossly dilated until a point where the ureter was kinked around the superior
38 mesenteric vein (SMV) (Fig.2). The ureter was divided just distal to the junction of
39 the dilated and normal ureter. The redundant pelvis and the grossly dilated upper
40 ureter was excised and the pelviureteric anastomosis was done over a 6F double J
41 stent to bring it anterior to SMV (Fig.3). The patient was sent home on the fourth post
42 operative day after an uneventful hospital stay. The double J stent was removed
43 after 03 weeks. She is still in follow up and symptom free. The facility of nuclear scan
44 is not available in the institution and closest center to offer this facility is 250
45 kilometres away hence it could not be done.

46 FIGURES



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50 Fig.1: CT urography showing the dilated right renal pelvis and upper ureter.
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Fig. 2: Showing dilated upper part of the ureter and PUJ kinked around superior mesenteric vein.



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Fig. 3: Showing anteriorly placed uretero pelvic anastomosis.

64 DISCUSSION

65 Pelviureteric junction (PUJ) obstruction refers to a condition where the drainage of
66 urine from the renal pelvis to the ureter is obstructed. This can be due to the intrinsic

67 causes or any extrinsic cause. Most common cause of intrinsic PUJO is
68 disorientation or complete absence of muscle fibres or excessive collagen deposition
69 in the muscle fibres at PUJ along with decrease of nerve terminals and nerves at
70 stenotic segments. These all factors lead to ineffective peristalsis causing caliectasis
71 and hydronephrosis and failure of passage of urine from renal pelvis to the ureter.
72 Impacted stones, strictures secondary to instrumentation, ureteral polyps and
73 persistent fetal involutions are other intrinsic causes of PUJO. A crossing lower pole
74 renal vessel is the most significant external cause of PUJO apart from external
75 compression of the PUJ by kinks, tumors, high insertion of ureter or retroperitoneal
76 fibrosis. ^[1,2,4] Lower pole crossing vessels may arise from aorta, vena cava, renal
77 vessels or iliac vessels. Most of the times crossing vessels are arteries and they are
78 anterior branches. ^[5] They may be the only possible cause of PUJO. ^[1] Maheshwari et
79 al has reported a case of 26 years old female where the PUJO was caused by Veins
80 of Retzius. ^[3] They are the anastomotic channels between superior or inferior
81 mesenteric vein and the inferior vena cava. They can provide a route for the spread
82 of colonic malignancies and can easily be injured during the right hemicolectomy. The
83 kinking of ureter due to wrapping around the superior mesenteric vein leading to
84 features of pelvireteric junction obstruction has never been reported in literature. It is
85 very difficult to say if the crossing vessels are responsible for PUJO or they are mere
86 associations with this condition as it occurs in about 25-50% of the patients.
87 Crossing vessels can be a source of haemorrhage during minimally invasive
88 techniques for PUJO like endopyelotomy. They further can be a cause of recurrent
89 obstruction after minimal access surgery thus responsible for long term failure of
90 these techniques. The patients usually present with an intraabdominal mass, flank
91 pain, nausea, and repeated features of urinary tract obstruction (UTI). USG of the
92 abdomen is the initial investigation of choice which will pick up the dilated
93 pelvicalyceal systems and the pelvis. Antenatal USG can even pick up
94 hydronephrosis in the foetuses from 16- 20 weeks onwards. An antero posterior
95 diameter of renal pelvis more than 10-11 mm is diagnostic of PUJO. A Doppler
96 resistive index of > 0.7 is an indicator of obstruction. ^[6] Intravenous pyelography (IVP)
97 used to be the diagnostic modality in past but now a days it has been replaced with
98 nuclear scans. They can diagnose obstruction as well as predict the differential renal
99 function (DRF) thus helping in planning the surgical intervention. Dimercaptosuccinic
100 acid (DMSA) is a cortical agent whereas diethylenetriaminepentaacetic acid (DTPA)

101 and mercaptoacetyltriglycine (MAG 3) are the tubular agents . MAG-3 is considered
102 the best scan for diagnosing PUJO. A clearance of less than half of total radio
103 isotope at 20 minutes is considered diagnostic of PUJO. A DRF of less than 10% is
104 an indication for nephrectomy.^[1] Computerised tomographic angiography (CTA), CT
105 urography, Magnetic resonance angiography (MRA) or MR urography gives the
106 detailed renal morphological picture along with the renal vascular relationship to the
107 PUJ. Every patient is not a case for treatment. Hydronephrosis will disappear after
108 birth in about 75% of the neonates. Worsening symptoms or deterioration of the
109 renal functions in a patient of PUJO are indications for surgical treatment. The
110 goals of surgery are to ensure free drainage of urine, enhance renal functions,
111 prevent complications and to render the patient symptom free.^[1,2] Anderson Hynes
112 dismembered pyeloplasty is considered as the gold standard but the more
113 conservative and minimally invasive techniques are also being employed with
114 equivalent success. Open dismembered Pyeloplasty has a success rate of about
115 95% .^[4] It can also be done by transperitoneal , retroperitoneal or robotic assisted
116 through laparoscopic approach. The aim of pyeloplasty is to remove the scarred
117 portion of PUJ, excise the redundant pelvis and fashion an anterior ureteropelvic
118 anastomosis to ensure the free and dependent exit of the urine from kidney to the
119 ureter. An antegrade or a retrograde endopyelotomy is the minimally invasive
120 endoscopic approach with about 85% success rate but the renal vascular information
121 is important as the lower pole renal vessels can lead to hemorrhage in case of injury
122 at endopyelotomy . Ureter can be attached to a lower pole renal calyx in case of
123 failed open pyeloplasty and extensive renal scarring.^[1,4] We contacted the patient
124 telephonically and she is doing well . She was called upon for review investigations
125 but she couldn't turnup for the same due to being from a far flung area around 200
126 kilometres away however, The patients should be followed with USG and MAG3
127 scans to ensure resolution of symptoms, improved renal functions and early
128 detection of recurrence or treatment failure.

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130 **CONCLUSION**

131 Lower pole crossing vessels are most important extrinsic cause of PUJO. Ureter
132 getting entangled around the superior mesenteric vein is a very rare cause of PUJO.
133 Anderson Hynes dismembered pyeloplasty is the treatment of choice .

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135 **CONFLICT OF INTEREST**

136 Authors declare no conflict of interests.

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138 **CONSENT**

139 Written informed consent was obtained from the patient for publication of this Case
140 report and any accompanying images. A copy of the written consent is available for
141 review by the Editor-in-Chief of this journal.

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UNDER PEER REVIEW