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Case report

Retroperitoneal fibrosis masquerading as pelvi-ureteric junction obstruction – Laparoscopic management

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ABSTRACT

Introduction: Retroperitoneal fibrosis (RPF) is a rare fibro-inflammatory condition which is characterized by development of extensive fibrosis throughout the retroperitoneum. It is classically centred over the anterior surface of the fourth and fifth lumbar vertebrae. It results in entrapment and extrinsic compression of retroperitoneal structures.

Presentation of the case: We present the case of a 69 years old man who was reported to have right pelvi - ureteric junction obstruction on computed tomography, but turned out to have RPF.

Discussion: Retroperitoneal fibrosis commonly causes obstructive uropathy (either unilateral, bilateral or progressing from unilateral to bilateral) and if untreated, renal failure. It has high response/remission rates to glucocorticoid therapy. However, relapse rates are also high. Hence, close surveillance with serial laboratory and imaging investigations, after achieving remission, is key to long term disease control.

Conclusion: Although classical imaging findings, supportive laboratory markers and suggestive/diagnostic histopathology appearances for RPF are well documented, its accurate preoperative diagnosis is not always an assured certainty.

1. Introduction

Retroperitoneal fibrosis, sometimes called Ormond's disease, is a rare chronic fibro -inflammatory sclerotic disease of the retroperitoneum which commonly involves the adventitia of the abdominal aorta and iliac arteries along with the surrounding retroperitoneum. It has an incidence of 0–1/100,000 per year. It has a male to female preponderance of 2:1–3:1, with a mean age of onset being 55–60 years [1,2]. Retroperitoneal fibrosis is divided into two types – idiopathic/primary and secondary. Idiopathic RPF is named after John Kelso Ormond, an American urologist who re-discovered the condition in 1948 and accounts for 75% of all the cases of RPF. In 1905, Albarra, a French urologist reported the first case of RPF. It is an enigmatic condition whose hallmark is the presence of sclerotic tissue in the retroperitoneum in the peri-aortic and/or peri-iliac territory. Idiopathic/Primary RPF is diagnosed after ruling out causes of secondary RPF such as exposure to certain culprit drugs, trauma, cancer, infection and exposure to radiation. Idiopathic RPF is considered to be of two types – immunoglobulin G 4 (IgG4) related (60% of the patients) and non IgG4 related (the remaining 40% patients) [1,2,3].

Herein, we report a unique case of idiopathic RPF in which the patient was initially mistakenly diagnosed as pelvi - ureteric junction obstruction (PUJO) and planned for a laparoscopic pyeloplasty. He eventually underwent a laparoscopic ureterolysis after an intraoperative change of plan. The patient was managed in a tertiary care corporate teaching hospital. This study is reported in line with the SCARE criteria [4].

2. Presentation of the case

A 69 years old man presented with colicky, non-radiating pain in the right loin. He had undergone a laparoscopic cholecystectomy 2 years back and was not on any medications. He did not give any history of major trauma or receiving radiation therapy in the past. He did not have a history of addictions (smoking, alcohol etc), drug dependence or any psychological condition. He did not have a family history of retroperitoneal fibrosis or any other obstructive uropathy. He was a retired civil engineer and had worked in the public works department of his state government; but did not give specific history of exposure to asbestos. He had a soft abdomen with minimal tenderness in the right loin. An

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abdominal ultrasound scan showed a very dilated right renal pelvis. A contrast enhanced computed tomography (CECT) of the abdomen was then done and was reported as right pelvi - ureteric junction (PUJ) obstruction (Fig. 1a & b). His white blood cell count (4100), serum Creatinine (1.16 mg/dL) and Urine-analysis were normal. His erythrocyte sedimentation rate (ESR) was 45. He was planned and taken up for a laparoscopic pyeloplasty for the reported right PUJ obstruction by the initial surgeon, an expert laparoscopist. Due to intra-operative difficulty in mobilizing the PUJ, the expert advanced laparoscopic surgeon was called in. Upon evaluating the CECT abdomen, the second surgeon concluded that the patient had hydro-uretero-nephrosis and not just hydronephrosis. This indicated that the level of obstruction was much below the PUJ. The rest of the operation was then performed by him. Upon initial dissection, a hugely dilated renal pelvis was confirmed. However, the ureter was also found to be significantly dilated (Fig. 1c). This indicated that the cause was not PUJ obstruction, but was further lower down, as suspected on intra-operative re-evaluation of the CECT films. Also noted in the retroperitoneum was tough fibrous tissue. As the ureter was traced caudally, a transverse thick fibrotic band was found at the level of the pelvic brim (Fig. 1d). Once we lysed this band, the stretch of ureter lower to this level was mobilized and was found to be of normal caliber (Fig. 2a). Thus, the cause of the obstruction was this retroperitoneal fibrotic band at the junction of upper two-thirds and lower one-third of the right ureter. These unexpected findings led to an intra-operative change of plan. A laparoscopic ureterolysis was performed - greater omentum was mobilized, interposed between the mobilized ureter and the retroperitoneum and suture-fixed to the parietes, so as to maintain it's altered position (Fig. 2b & c). At the level of the obstruction, the transition zone on the ureter was circumferentially surrounded by greater omentum (Fig. 2d). A sizeable chunk of the retroperitoneal fibrous tissue was excised and sent for a histopathological study. Cystoscopic double-J stenting of the right ureter was then performed. The patient had an uneventful immediate postoperative recovery and was discharged from the hospital on postoperative day(POD) 5. The histopathology report revealed fibrous tissue infiltrated by chronic inflammatory cells, namely lymphocytes and plasma cells (Fig. 3). Thus it confirmed retroperitoneal fibrosis. He was then started on tablet methyl prednisolone 1 mg/kg/day and was asked to taper this dosage by 10 mg every 2 weeks. He was also advised the following investigations: Immunohistochemistry analysis of his biopsy specimen to identify IgG4 positive plasma cells, Serum C-reactive Protein(CRP), a repeat Erythrocyte Sedimentation Rate(ESR), S.IgG4, Rheumatoid factor, Serum Anti-nuclear(ANA) & anti-smooth muscle antibodies, anti-neutrophil cytoplasmic antibodies(ANCA), antibodies against thyroid microsome and thyroglobulin, abdominal Magnetic resonance imaging(MRI), MRI aortography and fluoro-deoxy-glucose-Positron emission tomography. He was advised to maintain methyl prednisolone dose at 5 mg/day eventually, pending repeat imaging and laboratory investigations. Due to financial reasons and being a resident of another state, he sought to do all of the above in his home town. During his POD 10 out-patient department follow up visit, all the operative wounds had healed well. He was lost to follow up, thereafter. The authors managed to telephonically contact the patient's son, only 10 years after his surgery. As per telephonic information obtained from him, the patient had continued treatment with a urologist, in his home state. Though no reports are available, the patient had gone into remission 3 months after his surgery, after which his pharmacotherapy was de-escalated and the D-J stent was removed. He had 3 relapses of the disease in the interim, during which glucocorticoid therapy was re-started and escalated; details of which are sketchy. The patient had passed away 1 year ago (9 years after his surgery), due to an unrelated cause (acute myocardial infarction).

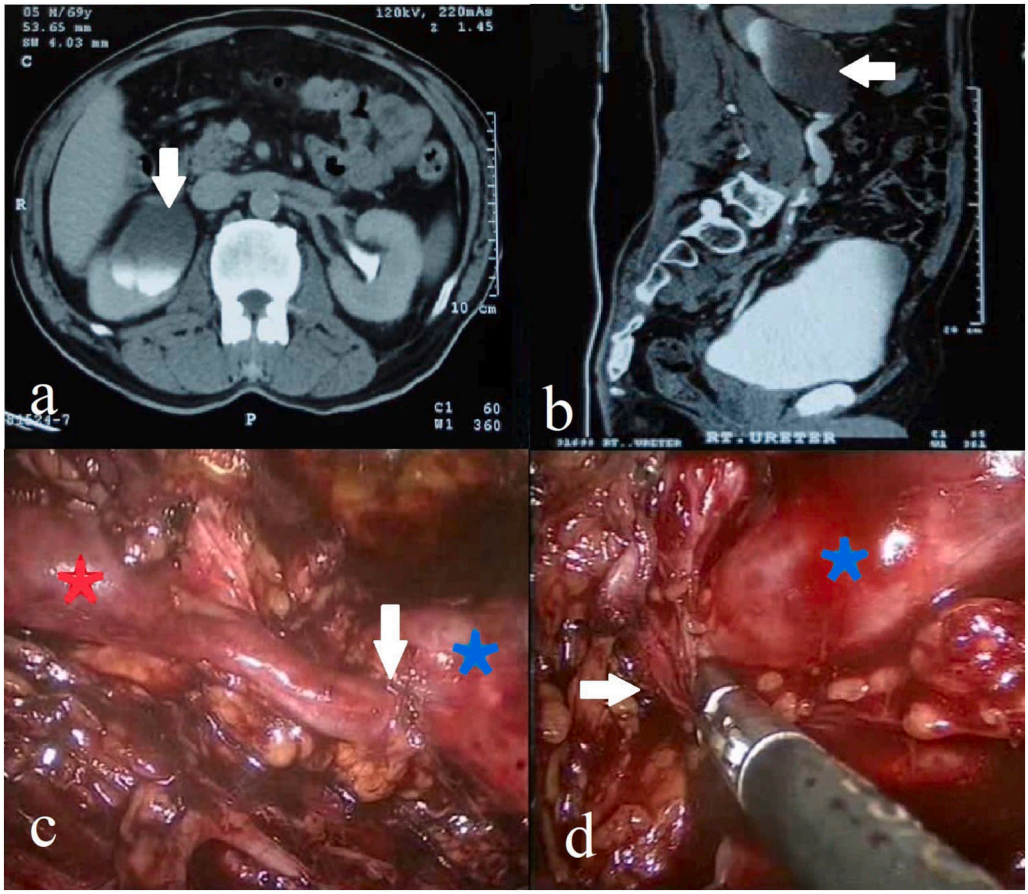

Fig. 1.. Pre-op imaging & operative pics. a) & b) CECT abdomen. a) Axial view showing right hydronephrosis (white arrow), b) Sagittal view showing right hydronephrosis & 'apparent' PUJ obstruction. c) & d) Operative pics. c) shows right PUJ (white arrow), hydronephrosis (blue asterisk) and hydroureter (red asterisk) seen after initial dissection and mobilization, d) shows the culprit – an obstructing, thick, transverse fibrotic band (white arrow) at the level of the pelvic brim & proximal hydroureter (blue asterisk).

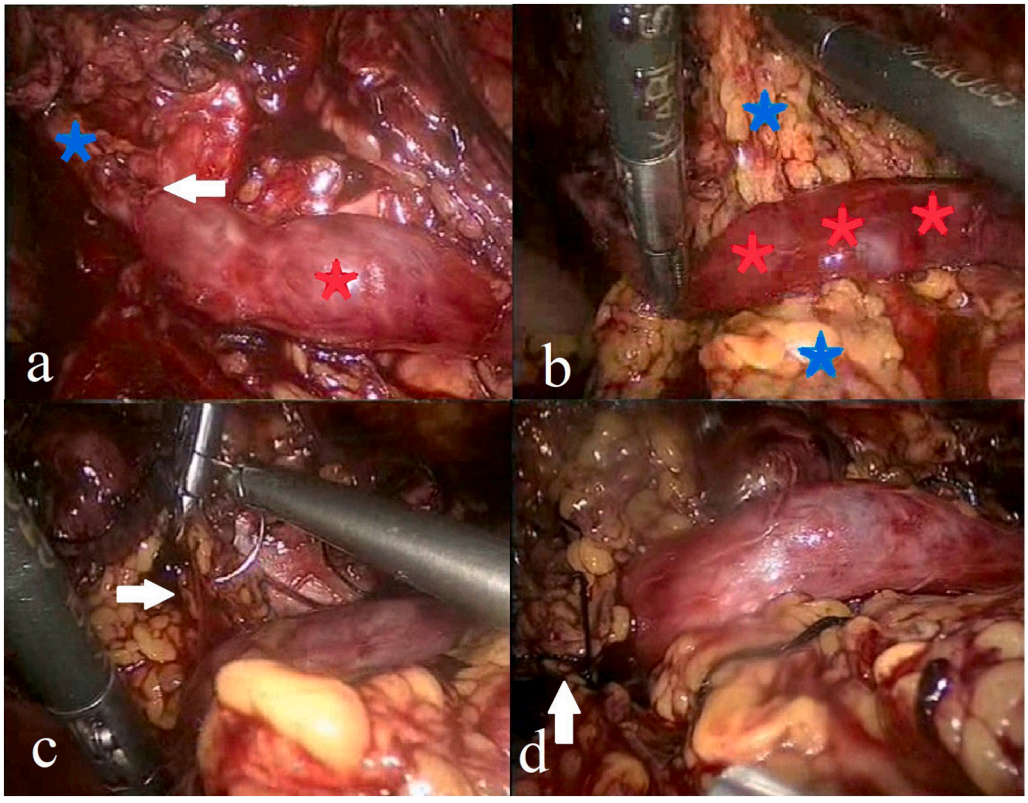

Fig. 2.. Operative pics. a) shows the mobilised right ureter after lysis of the obstructing band : the proximal 2/3rd dilated stretch (red asterisk), the zone of transition (white arrow) & the distal 1/3rd stretch with normal calibre, b) shows interposition of greater omentum (blue asterisks) between the ureter (red asterisks) and the retro-peritoneum, c) shows the greater omentum being suture-fixed to the right parietes (white arrow), d) shows circumferential omental enveloping of the zone of transition on the right ureter (white arrow)

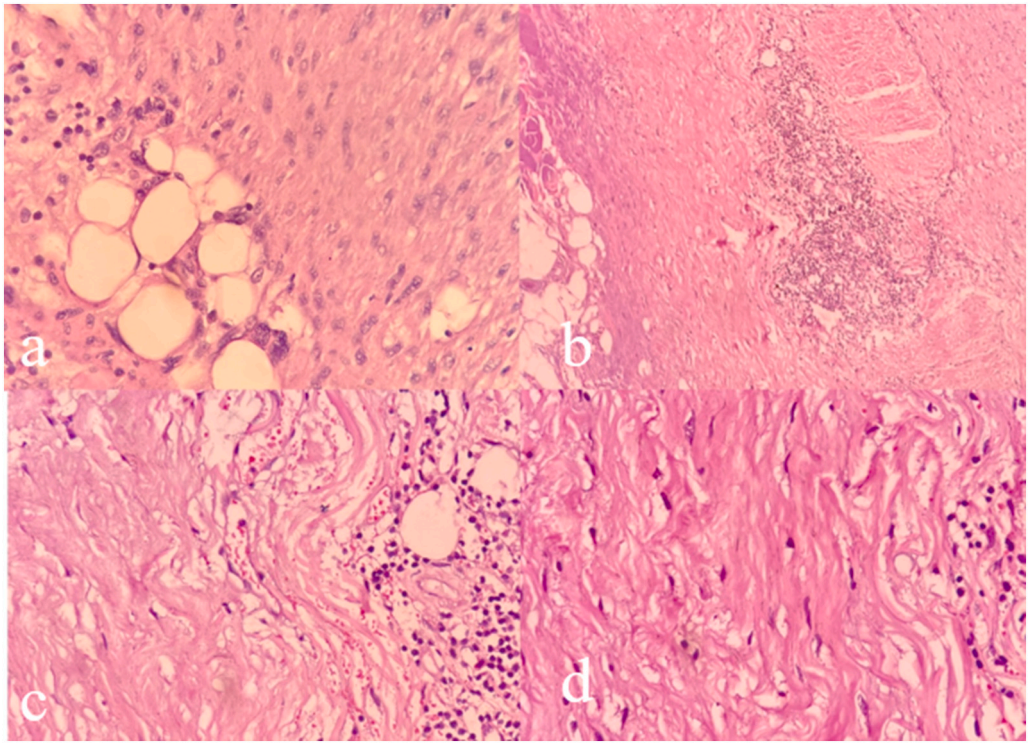

Fig. 3. Histopathological slides a) Fibrous tissue entrapping adipocytes. b) Fibrous tissue infiltrated by chronic inflammatory cells consisting of lymphocytes and plasma.

3. Discussion

Retroperitoneal fibrosis generally gets detected incidentally, on imaging, during workup of backache or urinary tract obstruction. A definitive diagnosis requires retroperitoneal tissue biopsy. However, the role of biopsy as a mandatory investigation is controversial, particularly

if imaging studies reveal findings classical of RPF [5]. The disease also affects other blood vessels such as the thoracic aorta and mesenteric arteries [1,3]. This indicates that RPF is a primary systemic inflammatory disease of large arteries [1,3]. Though not conclusively proven, Ceroid, which is a complex polymer of oxidized lipids and proteins found in atherosclerotic plaques, is thought to be the antigen that triggers the inflammatory cascade of RPF [5]. Its escape through the weakened media of the affected large arteries thereby resulting in local immune reaction with inflammation and subsequent fibrosis has been postulated as the possible pathogenesis of primary RPF [2].

Secondary RPF is associated with malignancies such as lymphoma, sarcoma, multiple myeloma, carcinoid, carcinomas of the colon, rectum, prostate, stomach, pancreas, breast, cervix, endometrium and lungs [6]. It is also associated with trauma, previous abdominal surgery, previous radiation therapy and infections such as tuberculosis, actinomycosis, gonorrhea, histoplasmosis and shistosomiasis [6]. In some patients, it is associated with smoking, asbestos exposure and with drugs such as methysergide, ergotamine, β-blockers, pergolide, phenacetin, methyldopa, bromocryptine, hydrallazine, analgesics, etc. [6]. It also has a known association with Erdheim - Chester disease [2,6]. It is important to distinguish between idiopathic/primary and secondary RPF as the treatment of the two subtypes differs vastly. Secondary RPF is managed by treating/managing the primary condition. Idiopathic RPF is considered an immune mediated disease which occurs either as a standalone disease sometimes associated with other autoimmune diseases such as Hashimoto's thyroiditis, rheumatoid disease etc. or as part of a multifocal fibro-inflammatory disorder called IgG4 related disease (IgG4-RD) [6]. IgG4-RD can affect nearly any organ system but commonly involves/causes major salivary/lacrimal gland enlargement, orbital disease, autoimmune pancreatitis, RPF and tubule-interstitial nephritis [6]. It is characterized by an elevation of S.IgG4 levels (>135 mg/dL) and significantly increased tissue infiltration with IgG4 positive plasma cells (IgG4/IgG ratio > 40%, >10 IgG4 positive plasma cells/high power field) [6]. S.IgG4 levels may be normal in 30% of the patients [2,7]. A study has indicated that elevated S.IgE levels and tissue eosinophilia are distinctive features of idiopathic RPF in the Chinese population [8].

Unlike our case, idiopathic RPF is usually an insidious condition that presents with vague, non-specific backache, malaise, anorexia and weight loss with or without low-grade fever [1,5]. As the degree of fibrosis progresses, the symptoms are mainly related to entrapment and extrinsic compression of retroperitoneal structures. In most patients, the fibro-inflammatory tissue involves and entraps the ureters, thereby causing obstructive uropathy and if untreated, eventual renal failure [1,5]. Unlike our case, the ureteral involvement is usually bilateral in a majority of situations [1]. Extrinsic compression of retroperitoneal lymphatics and veinous drainage causes back pressure changes and lower extremity edema and/or deep vein thrombosis [1,3,5]. Compression of the gonadal vessels may result in scrotal swelling, varicocele, and/or hydrocele [1,5]. Involvement of the mesentery, small intestine, duodenum, and colon has also been described and causes constipation and rarely leads to intestinal ischemia [1,5]. Involvement of the renal arteries may lead to reno-vascular hypertension [1].

At the microscopic – cellular level, RPF has two stages: an early active cellular stage and a late inactive fibrotic stage. The early stage is characterized by an immature fibrotic process, typically para-aortic, with capillary proliferation and a diffuse and peri-vascular infiltrate of abundant inflammatory cells — predominantly T and B lymphocytes, plasma cells, and fibroblasts in a loose matrix of collagen fibers. In this stage, the tissue is often edematous and highly vascular [9]. As the disease progresses, the collagen tends to become hyalinized with reduction of cellular activity. The mature plaque is composed of relatively acellular and avascular dense hyalinized collagen and scattered calcifications [9]. Immunohistochemical analysis reveals that most of the inflammatory cells are positive for the IgG4 isotype [9].

Imaging investigations like CECT abdomen, MRI, Positron Emission Tomography(PET) and of late, hybrid PET/CT & PET/MRI are of great help in primary diagnosis as well as prediction of response to pharmacotherapy and serial monitoring of the disease [10]. On ultrasonography (USG), RPF appears as a hypoechoic or isoechoic, well-demarcated, irregular shaped retroperitoneal mass anterior to the lower lumbar spine or sacral promontory [9]. On CECT, RPF looks like a well-defined, irregular soft-tissue peri-aortic mass, which extends from the level of the renal arteries to the iliac vessels. Very often, encasement of the ureters and the inferior vena cava are noted. The mass usually lies anterior and lateral to the aorta and does not cause its displacement. Contrast enhancement on CECT suggests an early active cellular stage RPF [9]. On T1 weighted images of MRI, idiopathic RPF typically has low signal intensity. The signal intensity on T2-weighted images is variable and reflects the degree of associated active inflammation (hypercellularity and edema). After administration of intravenous gadolinium contrast material, early soft-tissue enhancement mirrors the degree of inflammatory activity observed at T2-weighted imaging [9]. Active inflammation, which is characteristic of early idiopathic RPF, may be recognized as high T2 signal intensity on MRI and contrast enhancement on CECT. The late inactive stage is characterized by predominant fibrosis and is relatively acellular and hypovascular. It usually has low T2 signal intensity on MRI and little or no contrast enhancement on CECT [9]. A PET scan provides evaluation of the full extent and distribution of RPF. It can also reveal infectious, neoplastic and autoimmune conditions, with which RPF has known associations. It is also useful in identifying optimum sites for biopsy [9]. These features of CECT/MRI/PET help in assessment of the response to treatment. A decrease in T2 signal intensity and in gadolinium contrast enhancement on MRI/diminished contrast enhancement on CECT/decreased 5 fluoro-deoxyglucose(5-FDG) avidity on PET indicate a favorable response to treatment. The same features can be used to diagnose relapses [9,10].

Inflammatory markers used for monitoring activity of the disease are serum CRP and ESR. Retroperitoneal tissue biopsy is performed if imaging doesn't show classical location and appearance of RPF, when clinical and laboratory findings indicate an underlying malignancy, in patients non-responsive to steroid therapy and when available experience with RPF is modest [5,11]. Salient histopathological features depend on the stage of the disease and are described earlier. Other laboratory investigations that are an integral part of the RPF workup (due to it's close association with IgG4-RD and other autoimmune diseases) are serum IgG-4 levels, rheumatoid factor, anti-thyroglobulin antibody, ANCA, ANA, anti-smooth muscle antibodies and anti-thyroid microsomal antibodies [11].

Therapy comprises of medicines and if required, surgery, for preservation of renal function. Secondary RPF is managed by treating the precipitating cause. Idiopathic RPF is treated by glucocorticoids (Methyl prednisolone 0.6–1 mg/kg/day for 4 weeks and then gradual tapering to a maintenance dose of 2.5–5 mg/day for >6 months [6]. In case of steroid toxicity, contraindication or steroid refractory disease, some other drugs have been used. Tamoxifen is a viable alternative; though not as effective [1,5]. Methotrexate combined with low dose Prednisone is a promising option for treatment of patients with relapses who need long term therapy [11]. Mycophenolate mofetil is another promising alternative for this subgroup of patients [1]. However both are yet to be validated by prospective randomized studies. Biological agents like rituximab, infliximab (anti TNF α-monoclonal antibody) and tocilizumab (anti Interleukin-6 receptor antibody) have achieved good results in some cases, but are yet to be researched and validated [11]. They may be effective alternatives for patients with steroid refractory disease [1]. Pharmacotherapy can be stopped after achieving satisfactory remission, but may have to be re-escalated. Though remission rates are as high as 75–95%, a relapse rate of 72% has been reported [1].

Surgery is primarily for the obstructive uropathy. A double-J stent insertion or, when required, percutaneous nephrostomy relieve the obstruction [2,6]. Pharmacotherapy is then instituted concurrently to achieve remission (alleviation of symptoms and hydronephrosis with normalization of markers and radiological improvement). This is then

closely monitored by surveillance (serial measurement/assessment of inflammatory markers, symptomatology and imaging appearances) [6]. MRI is better for serial imaging than CT as it does not cause exposure to radiation [9]. The stent can be removed after confirming remission. Surgical ureterolysis (open, laparoscopic or robotic) may have to be performed in patients in whom there are technical difficulties or complications during the cystoscopic/percutaneous procedures to relieve the obstruction and who are refractory to pharmacotherapy [5,6]. In patients of RPF manifesting vascular aneurysms (10–20% of cases of idiopathic RPF), *endo*-vascular or open surgical repair of the aneurysm/s may have to be performed [1,2]. Fig. 4 amalgamates and summarizes the diagnostic and therapeutic cascades of this insidious and enigmatic condition.

4. Conclusion

Retroperitoneal fibrosis is a rare disease that can be mistaken for other commoner causes of obstructive uropathy, as seen in this report. Due to its rarity, no prospective randomized studies exist on components of its pharmacotherapy, other than glucocorticoids. Remission rates post glucocorticoid therapy are high, but, so are the rates of relapse. Continuing surveillance by laboratory (S.CRP, ESR) and imaging (MRI/FDG-PET/CECT) investigations are crucial to early identification of remissions and relapses; so that therapy can be de-escalated or re-escalated, respectively.

Sources of funding

None.

Ethical approval

This type of study does not require any ethical approval at our institution.

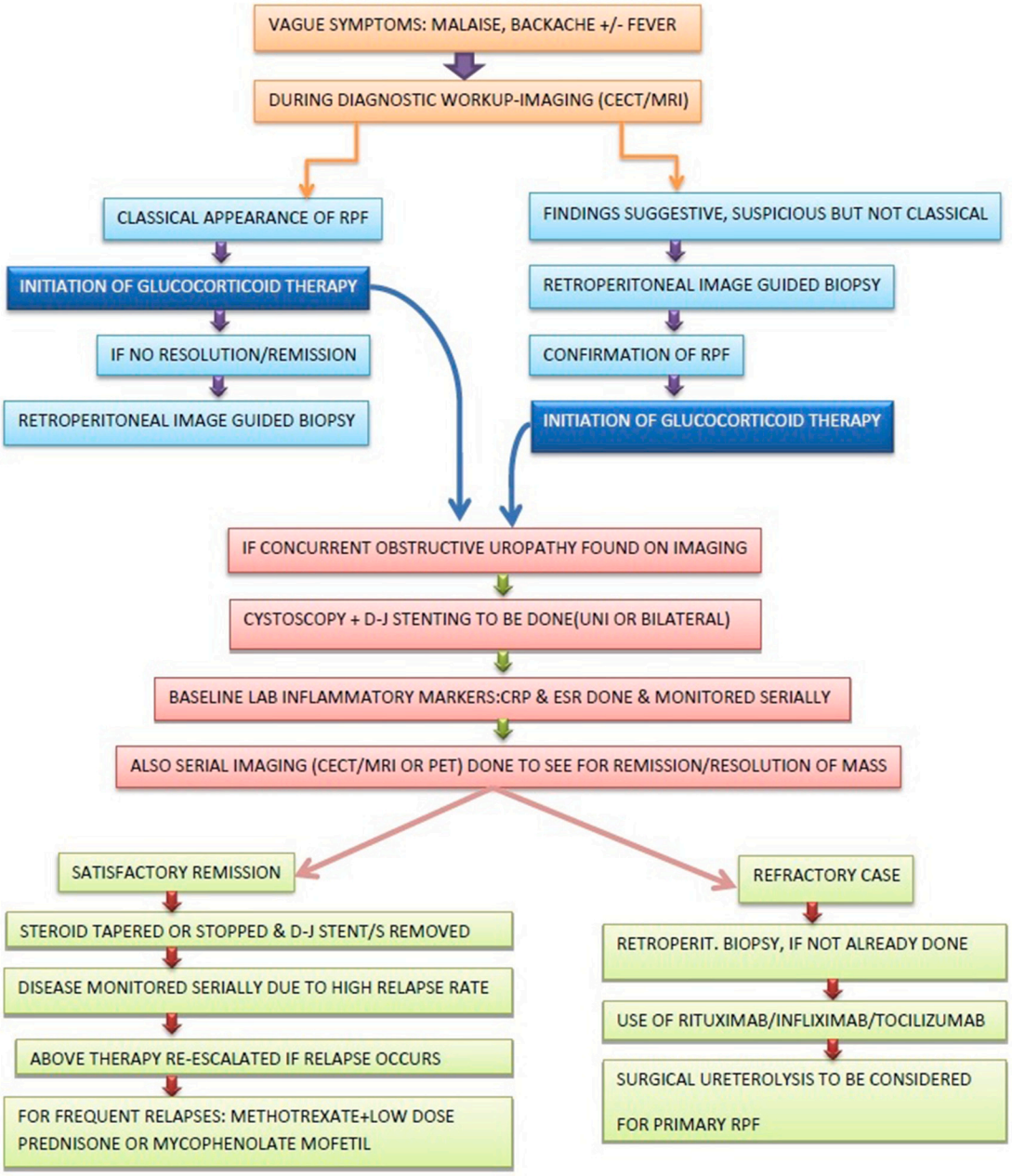

Fig. 4. Diagnostic and therapeutic flow chart for RPF.

Consent

Written informed consent was obtained from the patients for publication of these case reports and accompanying images. Copies of the written consents are available for review by the Editor-in-Chief of this journal on request.

Registration of research studies

Not applicable.

Gurantor

Abhijit Joshi

Provenance and peer review

Not commissioned, externally peer-reviewed.

Timeline of events

Day	Event
0	Surgery done – Lap Rt. Ureterolysis with Cystoscopic Rt. D-J stenting
3	Passed flatus – started on clear liquids PO
4	Liquids tolerated – started on semisolid diet
5	Had 1st postop. bowel movement & discharged
10	OPD follow up – all lap. wounds healed well

CRediT authorship contribution statement

1)Vishal Chawda: Writing - Original draft, Visualization.
2)Prakashchandra Shetty: Writing – Review & Editing, Supervision.
3)Abhijit Joshi: Conceptualization, Validation, Resources, Writing – Review & Editing, Visualization, Supervision, Project administration.
Contributor:

Sushil Modkharkar MD, for Selection, Creation and Markup of histopathology slide pictures.

Declaration of competing interest

None.

References

[1] A. Vaglio, F. Maritati, Idiopathic retroperitoneal fibrosis, J Am SocNephrol. 27 (7) (2016 Jul) 1880–1889, https://doi.org/10.1681/ASN.2015101110. Epub 2016 Feb 9.
[2] F. Peisen, W.M. Thaiss, K. Ekert, M. Horger, B. Amend, J. Bedke, et al., Retroperitoneal fibrosis and its differential diagnoses : the role of radiological imaging, Rofo 192 (10) (2020) 929–936.
[3] L. Lian, C. Wang, J.L. Tian, IgG4-related retroperitoneal fibrosis: a newly characterized disease, Int. J. Rheum. Dis. 19 (11) (2016 Nov) 1049–1055, https://doi.org/10.1111/1756-185X.12863. Epub 2016 Apr 29 PMID: 27125330.
[4] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE group, The SCARE 2020 guideline: updating Consensus Surgical CAseREport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230.
[5] J.S. Engelsgjerd, LaGrange CA, Retroperitoneal Fibrosis. [Updated 2020 Sep 12, in: StatPearls [Internet], StatPearls Publishing, Treasure Island (FL), 2021 Jan. Bookshelf ID: NBK482409.
[6] T. Tanaka, N. Masumori, Current approach to diagnosis and management of retroperitoneal fibrosis, Int. J. Urol. 27 (5) (2020) 387–394.
[7] N. Fujimori, T. Ito, H. Igarashi, T. Oono, T. Nakamura, Y. Niina, M. Hijioka, L. Lee, M. Uchida, R. Takayanagi, Retroperitoneal fibrosis associated with immunoglobulin G4-related disease, World J. Gastroenterol. 19 (1) (2013 Jan 7) 35–41, https://doi.org/10.3748/wjg.v19.i1.35.
[8] S. Liao, X. Zhang, F. Zhu, Y. Wang, J. Zhu, J. Zhang, F. Huang, Comparison of two subsets of Chinese patients with retroperitoneal fibrosis in terms of IgG4 immunohistochemical staining, Rheumatology (Oxford). 58 (3) (2019 Mar 1) 455–462, https://doi.org/10.1093/rheumatology/key324. PMID: 30476270.
[9] R.O. Caiafa, A.S. Vinuesa, R.S. Izquierdo, B.P. Brufau, AyusoColella JR, C. N. Molina, Retroperitoneal fibrosis: role of imaging in diagnosis and follow-up, Radiographics 33 (2) (2013) 535–552, https://doi.org/10.1148/rg.332125085. Erratum in: Radiographics. 2014 Jan-Feb;34(1):15a. PMID: 23479712. Mar-Apr.
[10] I.T.G. Milojevic, B. Milojevic, D.P. Sobic-Saranovic, V.M. Artiko, Impact of hybrid molecular imaging in retroperitoneal fibrosis : a systematic review, Rheumatol. Int. 38 (2) (2018 Feb) 179–187.
[11] M.L. Urban, A. Palmisano, M. Nicastro, D. Corradi, C. Buzio, A. Vaglio, Idiopathic and secondary forms of retroperitoneal fibrosis: a diagnostic approach, Rev. Med. Interne 36 (1) (2015) 15–21.