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LAPAROSCOPIC TENCKHOFF CATHETER INSERTION USING AN IMPROVISED PRE-PERITONEAL TUNNELING TECHNIQUE UNDER CONSCIOUS SEDATION – 1 YEAR OUTCOME

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ABSTRACT

Background: Peritoneal dialysis (PD) catheter dysfunction is one of the reasons for PD dropout. Tenckhoff Catheter (TC) functional longevity will improve PD outcomes. This series aims to study the safety and feasibility of laparoscopic TC insertion using an improvised pre-peritoneal tunnelling technique under conscious sedation.

Methods: Retrospective observational study of patients underwent laparoscopic TC insertions using the proposed improvised preperitoneal tunneling technique under conscious sedation.

Results: The mean age of the patients was 51.10 (SD=13.43) years old. Patients' mean body mass index was 25.44 (SD=4.27) kg/m^2. The procedure was performed on 115 patients, 78 (67.8%) had previous abdominal surgery. 15 (13.0%) required catheters reinsertion using this technique due to non-functioning existing TC inserted via a different method. 3 (2.6%) of the patients developed primary catheter dysfunction. At one year post procedure the catheter survival rate was 97.3%, with a patient survival rate of 87.0%. At the time of writing, median catheter survival was 16.5 months.

Conclusion: Laparoscopic TC insertion using this pre-peritoneal tunneling technique under conscious sedation is able to yield satisfactory catheter functionality, particularly for patients with a history of abdominal surgery, all while avoiding the risks associated with general anesthesia.

Keywords: Peritoneal dialysis, Tenckhoff catheter, ESRD

INTRODUCTION

Chronic kidney disease (CKD) prevalence throughout Malaysia is 15.48%[1]. Despite having the second highest population, of 3.9million[2]. Sabah had the lowest dialysis prevalence compared to other states at 115 per million population (pmp) in 2018[3]. The state of Negeri Sembilan had the highest dialysis prevalence at 389pmp in the same year[3] for a population of 1.2million[1]. Multiple factors have contributed to this situation, including a scarcity of physical facilities for in-center hemodialysis (HD) and the challenging economic status of Sabah, which is recognized as the poorest state in Malaysia.

To improve the dialysis accessibility and provide optimum dialysis for end stage kidney disease (ESKD) population in Sabah, we opted to maximize peritoneal dialysis (PD) utilization as an immediate solution. PD is non-inferior as a kidney replacement therapy (KRT) to HD and has additional benefits at least during the initial years of dialysis[4,5,6]. Sabah adopted a "PD preferred" policy, whereby PD is prescribed as the initial dialysis modality for all ESKD patients who do not have an absolute contraindication for PD[6,7,8]. The success of this policy is determined by timely Tenckhoff catheter (TC) insertions with acceptable complications and success rate. Nephrologist-initiated PD catheter programs are noted to improve PD utilization[9].

There are many TC insertion modalities, namely, peritoneoscopic[9,10], Seldinger without imaging[11], Seldinger with imaging[12], laparoscopic and mini-laparotomy. Each technique has its pros and cons in terms of the resources required, learning curve, as well as procedure and catheter related complications[13]. The best outcome, in terms of primary failure rates reported, is following the advanced laparoscopic technique[14]. ESKD population generally have other co-morbidities which render them high risk for general anesthesia (GA). Although laparoscopic surgery is conventionally performed under GA, TC insertions using this modality under conscious sedation have been reported in literature[15,16].

The nephrology department in collaboration with the departments of general surgery and urology identified a strategy to perform laparoscopic TC insertions using an improvised pre-peritoneal tunneling technique under conscious sedation. We propose this technique as a modality of TC insertion that can be safely performed following adequate training to increase its availability across the country.

AIM

To evaluate the safety and feasibility of the proposed technique, we aim to analyze the primary failure rate and complication rate associated with this approach.

METHODOLOGY

This is a retrospective observational study of who underwent successful laparoscopic TC insertions using the improvised pre-peritoneal tunneling technique under conscious sedation at our center. This procedure was performed by two general surgeons and two interventional nephrologists between September 2020 to August 2022. The series started off in September 2020 but halted subsequently due to the COVID-19 pandemic and was resumed in March 2021. The patients were followed up till they completed one year. This minimally invasive technique allows inspection of the peritoneal cavity and catheter placement under direct vision thus translating to a shorter hospital stay and lower rates of inadvertent injuries[17]. Concerns regarding TC migration and omental wrap were addressed by the pre-peritoneal tunnelling component of this technique that provided fixation of the catheter in the pelvis.

Statistical analysis

All numerical data are summarised in mean and standard deviation or median and interquartile range depending on the data normality distribution. Categorical data are presented in frequencies and percentage. The one year patient survival rate is computed by the number of surviving patients at one year after the TC insertion divided total number of enrolled patients at the beginning of the study. All analyses were done by Microsoft excel version 16.78.

Patient selection:

All ESKD patients that agreed for CAPD as the modality of KRT we included in this study.

Patient preparation:

Patients, are pre-operatively screened for Methicillin-Resistant Staphylococcus Aureus (MRSA). Bowel preparation is done with laxatives and the bladder is emptied prior to the procedure. A prophylactic antibiotic is administered 1-2 hours before the procedure[18]. Vital signs monitoring and oxygen supplementation are provided.

Sedation and Analgesia:

The procedure is performed under intravenous (IV) sedation and analgesia as well as local anaesthesia (LA) for field block. IV Midazolam and IV Fentanyl are given in boluses by a trained resident to achieve a score of 3 to 4 on the Rikers Sedation-Agitation Scale. Patient's consciousness level, pain score, cardiac monitoring, and vital signs are monitored at regular intervals.

OPERATIVE TECHNIQUE:

1. TC entry point is identified and marked using the location of TC internal cuff as a guide when the base of the TC curl is placed at the level of the symphysis pubis.

2. Patient is placed in the supine position with both arms laid out and cleaned and draped in the usual manner.

3. A forward-oblique 30-degree, 5mm laparoscopic telescope and a 5-mm working port is used. The camera port is inserted either at infra / supra-umbilical regions or at the Palmer's point. Insertion site is tailored optimally for each patient based on their past surgical scars and body habitus. Initial access to the peritoneal cavity is gained using the open (Hasson) method[19,20] and a 5mm camera port is inserted before creation of pneumoperitoneum using carbon dioxide. Low pressure and flow settings at 6-8mmHg and 4L/minute respectively are used.

4. Diagnostic laparoscopy is performed taking note of adhesions, course of bilateral inferior epigastric vessels, inguinal hernial orifices and important anatomical landmarks, namely, median umbilical ligament, bilateral medial umbilical ligaments and the bladder (fig 1a). If the diagnostic laparoscopy findings deem the patient suitable for TC insertion, a field block is given at the pre-determined entry point before infiltration of the pre-peritoneal space with LA under direct visualization.

5. Pneumoperitoneum is desufflated temporarily and the entry site is cut-down until the rectus sheath. A stab incision is made on the rectus sheath to allow a 13Fr dilator to be inserted.

6. Pneumoperitoneum is re-insufflated and the dilator is advanced through the rectus muscle in a rotatory movement until the tip is seen tenting the peritoneum. The dilator is directed caudally and medially towards the ipsilateral medial umbilical ligament along the pre-peritoneal space. LA is infiltrated into the space via the dilator before it is advanced in a similar rotatory manner to create a pre-peritoneal tunnel. Infiltration of the pre-peritoneal space with LA provides the patient with better pain relief besides facilitating the safe passage of the dilator by hydro-dissection (fig1b) which prevents injury to the peritoneum and inferior epigastric vessels as well as creating a tamponade effect to prevent bleeding from capillaries (fig1c).

7. The peritoneum is perforated just lateral to the medial umbilical ligament at the level of the

bladder dome and an 18G guidewire is inserted via the dilator (fig1d) before the dilator is removed and reinserted over the guidewire along with a peel-away-sheath.

8. Once the sheath is within the peritoneal cavity, the dilator and guidewire are removed and a double-cuffed, coiled TC on a stylet is advanced through the sheath to be placed at the pelvis under direct vision (fig1e).

9. The sheath is peeled away (fig1f) and the stylet is removed. Pneumoperitoneum is desufflated and the internal cuff is embedded below the anterior rectus sheath. Flow is tested with 50 – 100cc of sterile water and the catheter is tunneled subcutaneously in the usual manner. Flow is tested again before the incisions are closed.

RESULTS

A total of 135 procedures attempted. 20 patients were excluded as 11 cases were abandoned due to severe adhesion,8 were successfully inserted without pre-peritoneal tunnelling due to inability to achieve adequate pneumoperitoneum and 1 was lost to follow-up. Patient demography and characteristics are as shown in Table 1. 115 patients underwent successful TC insertion with pre-peritoneal tunnelling without any major complications (Table 2). None of the patients developed vasovagal attack during the procedure as we conclude might be due to the low pressure and flow setting we used[1]. 78 (67.8%) of the patients had previous abdominal surgery, with 37 (47.4%) of them having adhesions at the previous scar site. 7 patients developed minor complications, 1 subcutaneous hematoma, 2 exit site bleeding and 4 leaking during training all of whom were treated conservatively. The 4 patients who developed leaking was rested for 2 weeks and CAPD training was restarted. The rest of the patients started PD on day 10 onwards as per our standard local protocol. 4 patients developed surgical site infection at the entry and exit site respectively within the first month. The peritonitis rate was 0.037 episodes per year. 3 (2.6%) patients developed primary catheter dysfunction. All the three catheter dysfunction occurred during training period. The number of catheters removed < 3months due to refractory peritonitis or exit infection were 0 and >3months due to refractory peritonitis or exit site infection were 3 (2.6%). Patient survival rate was 87.0% (n =100), the catheter survival rate for mechanical dysfunction alone was 97.3% (n=112) and mechanical dysfunction with infection related was 94.6% (n=109) at 1 year. No mortality was related to the procedure. Median catheter survival was 16.5 months at the time of writing.

Table 1. Demographics and patient characteristics

Total number of procedures	135
Insertion with PPT	115
Abandoned	11 (severe adhesion)
Insertion without PPT	9 (unsafe to proceed with tunneling)
Lost to follow-up	1
Gender	
Male	43.5% (n =50)
Female	56.5% (n =65)
Age, mean	51.1 (range 20-74)
Primary disease	
Diabetes mellitus	62.6%
Hypertension	20.8%
GN	13.2%
Others	3.4%*
Underlying disease	
Heart disease	12.3%
Dyslipidemia	39.5%
BMI (kg/m^2), mean	25.45kg/m2
≤ 24.9	36.5% (n=42)
25.0-29.9	52.2% (n=60)
≥30.0	11.3% (n=13)
Previous Abdominal surgery	
Pfannenstiel Caesarean section	n=29
Lap cholecystectomy / Appendicectomy/ BTL	n=6
Previous TC Insertion	n=28
Appendectomy/Cholecystectomy	n=8
Laparotomy	n=4
Previous Renal transplant	n=1
Previous Inguinal hernia	n=1
Nephrectomy	n=1
TC removal and reinsertion	15 (Catheter dysfunction – 11 omental wraps, 3 entangled in the bowel, 1 extraperitoneal) **

*Others – Renal stones, ADPKD

**Previous method (10 Seldinger without imaging, 2 Seldinger with imaging and 3 Peritoneoscope)

PPT – pre-peritoneal tunnelling; FSGS – focal segmental glomerulosclerosis; GN –glomerulonephritis; BMI – body mass index

Table 2 : Outcome

Adhesion at previous insertion site	47.7% (n= 37)
Complications	
Subcutaneous hematoma	n=1
Exit site bleeding	n=9
Leaking during training	n=4
Surgical site infection <1 month	n=4
Exit site infection < 1month	n=4
Primary catheter dysfunction	n=3
Catheter removed d/t ESI/Peri <3months	n=0
Catheter removed d/t ESI/Peri >3months	n=3
Completed Training	97.3% (n=112)
Peritonitis <1 month	1.7% (n=2)
1 year	
Patient survival	87.0%
Catheter survival	97.3% *
Catheter survival	94.6% **

* Patient who has passed away with functioning catheter and catheter removed due to refractory exit site or peritonitis has been censored

**Patients who have passed away with functioning catheter have been censored

d/t – due to; ESI- exit site infection; Peri- peritonitis

DISCUSSION

To establish a successful PD program, multiple factors play an essential role. Policy change[6,7] may result in good outcome but it has to go hand-in-hand with a strong TC insertion service[9], trained PD staff and funding to support the PD program. In terms of TC insertion, it's paramount to have a short waiting time and to be able to provide TC insertion for complex cases.

The nephrologists started contributing to TC insertion in November 2017. The modalities utilized based on patient characteristics (BMI, with or without previous abdominal surgery, type of abdominal surgery). The PD unit has been established since 1998, the number of PD patients in December 2019 was 178. Since implementing the PD-preferred policy in Jan 2020, our current PD patients are at 588 as of August 2023. It has tripled over the last two and a half years.

When a laparoscope is used only to ascertain the catheter tip position, the outcome is no different from any other catheter insertion method[22,23,24]. On the other hand, advanced laparoscopic methods that include either omentopexy, pre-peritoneal tunneling or suture fixation is associated with a significantly superior outcome compared with open insertion and basic laparoscopy[25]. A successful TC insertion is dependent on the longevity of the catheter survival by reducing the mechanical dysfunction and catheter lost due to infection [13]. Laparoscopic TC insertion under sedation with pre-peritoneal tunneling has been reported using nitrous oxide (NO) gas to create pneumoperitoneum[16].

The advantages of this method include the non-requirement for the cases to be done under GA, especially since many of the ESKD patients are high risk for GA. In addition, this technique of TC insertion requires only a single port and access to the peritoneal cavity is achieved using the Hasson method, which has a lower risk of complications[19,20]. In complex cases, diagnostic laparoscopy which is the initial step in this procedure can be used to assess the peritoneal cavity for the suitability of TC insertion. This is a particularly useful assessment for patients with history of insult to the peritoneal cavity, for example, abdominal surgery and PD peritonitis. TC survival can be ameliorated with pre-peritoneal tunneling by eliminating the possibility of catheter migration.

Reported primary failure rate for Seldinger TC insertion without imaging is 12.05 - 18.3%[26-30]. This method is suitable for most non-complex cases as the waiting time for this technique is shorter and the resources required are less compared to the other techniques. However, for patients who developed primary failure following Seldinger TC insertion technique, laparoscopic TC insertion with pre-peritoneal tunneling under sedation can be used as a modality for reinsertion of a new TC whilst being able to determine the cause for the previous failure.

The possibility of performing laparoscopic TC insertion under conscious sedation eliminates the risks associated with GA for ESKD patients, therefore allowing more such patients to benefit from its superior outcome which will also encourage these patients to choose PD as their choice of KRT. The ability to inspect the peritoneal cavity and insert the TC under direct vision increases its safety profile and prevents inadvertent vascular and visceral injuries. The utilization of laparoscopy in this technique for visualization alone with no need for instrumentation or handling of abdominal organs reduces the learning curve and further strengthens our proposition that this technique can be safely performed by surgical residents and interventional nephrologists following adequate training. This will increase the availability of this modality of TC insertion across the country in preparation for a PD-first policy in the near future and in line with the World Health Organization's vision of global access to healthcare.

CONCLUSION

Laparoscopic TC insertion under sedation with pre-peritoneal tunneling is a safe method. The low catheter dysfunction rate associated with this method allows patients to maintain CAPD effectively. In intricate cases, diagnostic laparoscopy can be utilized to evaluate the peritoneal cavity's suitability. This approach will further enhance the PD penetration in Malaysia.

ETHICAL APPROVAL

Ethical approval has been obtained for the present study from National Medical Researcher Register NMRR ID -22-00434-FPP(IIR) and approved for publication by the Director General of Health Malaysia. This study was completed in accordance with the Helsinki Declaration as revives in 2013.

INFORMED CONSENT TO PUBLISH

Written informed consent was obtained from the patients for anonymised information to be published in this article.

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RARE RENAL MANIFESTATION OF PLASMA CELL DISORDER

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CASE PRESENTATION

A 56 year old lady presented with 2 weeks history of nausea, vomiting, and unintentional weight loss, with reduced effort tolerance. She has underlying type 2 diabetes mellitus, and hypertension. On examination, blood pressure was 140 / 80mmhg, pallor conjunctivae, and other physical examination was normal. Her investigations showed creatinine of 1214 umol/L, urea 24.3 mmol/L, eGFR of 2 ml/min/1.73m^2, albumin 35 g/L, total protein 71g/L, globulin 34g/L, albumin /globulin ratio 1.08, haemoglobin 6.8 g/dl, platelet 312x 10^3/uL, total white cell 7.97 x 10^9/L, calcium 2.44 mmol/L, phosphate 2 mmol/L, and erythrocyte sedimentation rate (ESR) 100 mm/hr. Urine microscopy shows 1+ protein, no RBC presence and urine protein creatinine index of 12.9g/day. Immunology screening revealed normal ANA, C3, C4, and ANCA. Kidney ultrasound shows a left kidney size of 10.3cm, and right kidney of 11.7cm with preserved corticomedullary differentiation bilaterally. She was initially diagnosed with ESKD, and long-term kidney replacement therapy was planned for her.

DIFFERENTIAL DIAGNOSIS:

Initial differential diagnoses upon presentation were diabetic kidney disease, multiple myeloma, and secondary membranous nephropathy.

HISTOPATHOLOGICAL EXAMINATION

Given normal kidney size and lack of chronic features on ultrasound, she underwent renal biopsy. Histology analysis reveals a malignant plasma cell infiltration in the interstitial, occasional fractured cast in the tubules with diffused acute tubular injury and interstitial fibrosis. Immunohistochemistry of the malignant cells shows a positive value for CD 138 with a Ki67 proliferation index of about 50-60%. Otherwise, histology showed normal glomeruli. This finding was later confirmed with serum immunofixation, which revealed IgD lambda paraproteinemia, 2.7g/L and serum-free light chain lambda of 6380 mg/L, with a free light chain ratio of 0.002.

FINAL DIAGNOSIS:

Lambda restricted IgD multiple myeloma with light chain proximal tubulopathy and plasma cell infiltration.

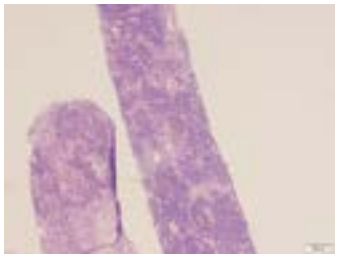

Figure 1: Dense infiltrate of plasma cells in the interstitial, compressing the tubules and microvasculature.

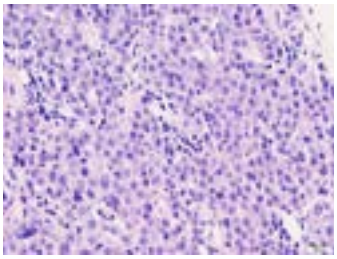

Figure 2: Atypical plasma cells can be appreciated with atypical hyperchromatic nuclei.

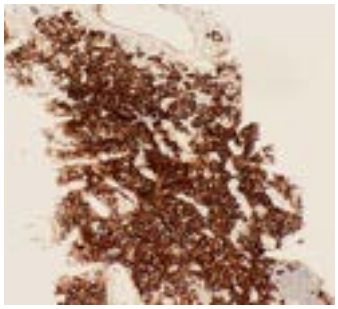

Figure 3: Immunostaining for CD138 highlighting the plasma cells.

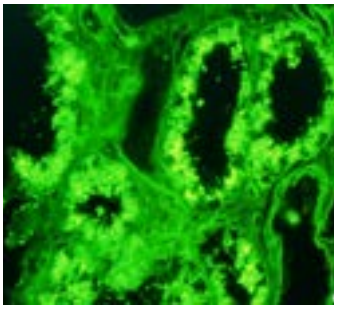

Figure 4: Immunofluorescence image showing deposits of kappa along the tubular basement membrane.

LEARNING POINTS

1. The association of kidney failure, and anaemia; with or without hypercalcemia should raise suspicion of multiple myeloma.
2. The occurrence of plasma cell infiltration in the kidney is extremely rare, and usually with the presence of other myeloma kidney manifestation.
3. Proteinuria with presence of albuminuria suggests the presence of myeloma cast nephropathy as well as light chain deposition disease which cause disruption of the filtration barrier or glomerular basement membrane.
4. Histology findings of acute tubular injury and acute tubulointerstitial nephritis should raise a ‘red flag’ for potential injury from high levels of free light chains in patients with multiple myeloma.

NEPHROTIC SYNDROME IN YOUNG ADOLESCENT

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CASE PRESENTATION

A 13-year-old female presented with a one-week history of bilateral lower limb swelling associated with cough and sore throat. There was no fever, breathlessness, hematuria, or frothy urine. She denied connective tissue disease-related symptoms. There was also no family history of autoimmune disease or chronic kidney disease. On examination, her blood pressure was 135/91 mmHg with conjunctival pallor and lower limb pitting oedema. Her initial investigation showed haemoglobin of 9g/dL, LDH 390U/L, positive Coombs test with IgG 2+ and C3D 3+, and peripheral blood film showed spherocytes with no schistocytes or agglutination. Her creatinine was 40 µmol/L, urine protein 4+ blood 1+, 24-hour urinary protein of 7.4g/day and low albumin of 20g/dL. Her viral screening was non-reactive, and an immunology workup revealed negative ANA with normal C3 and C4 levels as well as negative ASOT.

DIFFERENTIAL DIAGNOSIS

Our initial impression was nephrotic syndrome secondary to minimal change disease with autoimmune hemolytic anaemia. Differential diagnoses would be lupus nephritis and focal segmental glomerulosclerosis.

She was treated empirically with high-dose prednisolone of 1mg/kg/day. Her haemoglobin normalised to 13g/dL after 6 weeks of high-dose prednisolone. However, she developed steroid toxicity and was still in a heavy nephrosis state as evidenced by low albumin of 25g/dL with urinalysis protein 4+ blood 2+ and urine protein creatinine index of 6.7g/day. Her repeated ANA serology came back positive and she subsequently underwent renal biopsy.

Her renal biopsy showed a diffuse membranous pattern with immunofluorescence study demonstrating positivity of all immunoglobulin heavy chain and complement favouring immune complex-mediated glomerulonephritis.

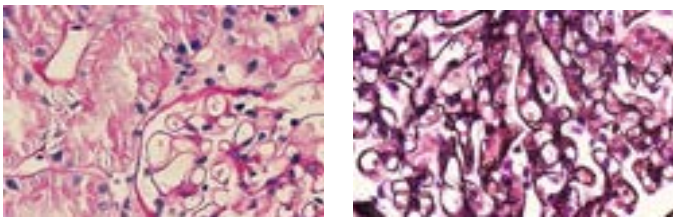

Fig 1. (A) Rigid capillary loops within glomeruli (Periodic acid-Schiff,100x) (B) Diffuse and global but subtle membrane lucencies within the capillary walls (Methenamine Silver,400x)

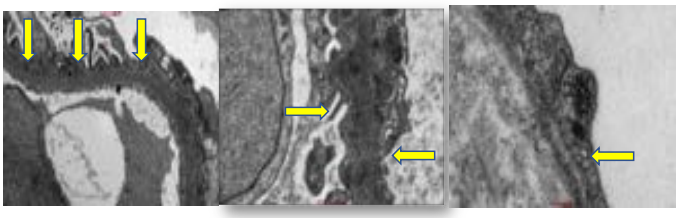

Fig 2. Electron micrographs demonstrating the ultrastructure of the glomerular capillary walls (A) Sparse subepithelial electron dense deposits (EDD) (B) Concomitant subepithelial and subendothelial EDDs (C) Tubuloreticular inclusions present within the endothelial cell (indicated by arrows)

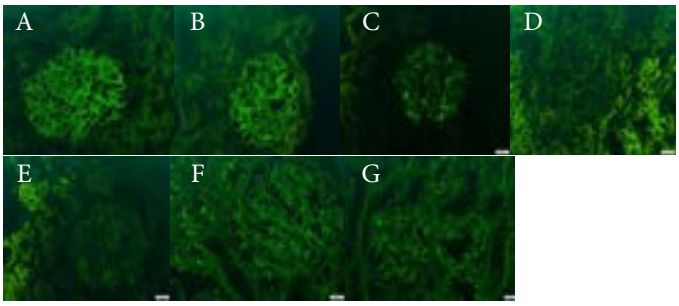

Fig 3. Composite image showing immunofluorescence microscopy at different magnifications with strong granular positivity along the capillary walls for IgG, IgA & IgM, and to much lesser intensity for C3, C1q, Kappa and Lambda light chains (Kappa & Lambda staining was done on paraffin tissue sections). A.IgG B.IgA C.IgM D.C3 E.C1q F.Kappa G.Lambda

FINAL DIAGNOSIS

Membranous lupus nephritis, ISN/RPS class V.

LEARNING POINTS

1. The presentation of nephrotic syndrome in association with autoimmune haemolytic anaemia should raise suspicion of autoimmune disease like systemic lupus erythematosus (SLE), especially in female patient.
2. ANA serology is not always detectable during the initial disease presentation.
3. Young adolescents with nephrotic syndrome should always be counselled for renal biopsy rather than empirical treatment with high-dose steroid due to the risk of steroid toxicity.
4. Lack of response to high-dose prednisolone in presumed minimal change disease should alert clinicians of other differential diagnoses.

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PNEUMONIA – THE SILENT RENAL KILLER

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CASE PRESENTATION

The patient, a 48-year-old woman with no known medical conditions, presented with intermittent fever and dyspnea for two weeks. She also experienced bilateral hand and lower limb swelling for three days, accompanied by purplish spots on both plantar aspects. Initially diagnosed with pneumonia, she was subsequently found to have mixed connective tissue disease and interstitial lung disease based on positive anti-Ribonucleoprotein antibodies, anti-Smith antibodies, and Rheumatoid Factor. Clinically she required nasal prong oxygen support , had a blood pressure of 150/90 mmHg, pulse rate of 88 beats per minute, oxygen saturation of 99%, and was afebrile. Lung examination revealed coarse crepitations on the right side up to midzone, along with bilateral pedal oedema.

INVESTIGATION

Patients' blood investigations were Hemoglobin 9.4g/dl, White Blood Cell 21.4 x 109/ L, Platelet 699 x109/ L, C reactive protein 75.5 mg/L, Urea 19 mmol/L, Creatinine 256 µmol/ L, relatively normal liver enzymes. Cytoplasmic Anti neutrophil Cytoplasmic Antibodies (cANCA) were detected positive while the other repeated immunology panels were negative.

Urinalysis showed blood 3+ , protein 1+ with a Protein Creatinine Index(PCI) of 3g/day. Cytoplasmic Anti neutrophil Cytoplasmic Antibodies (cANCA) was detected positive while the other repeated immunology panels were negative.

DIFFERENTIAL DIAGNOSIS

Initial impression was mixed connective tissue disease with pre renal Acute Kidney Injury (AKI). Differential diagnoses are sepsis induced AKI , Anca related Glomerulonephritis (GN) or Infection related GN.

HISTOPATHOLOGICAL EXAMINATION

Renal biopsy shows a diffuse sclerosing pattern changes with granulomatous nephritis.

A negative Immunofluorescence (IF) study concluded sclerosing and granulomatous form of ANCA related pauci-immune glomerulonephritis.

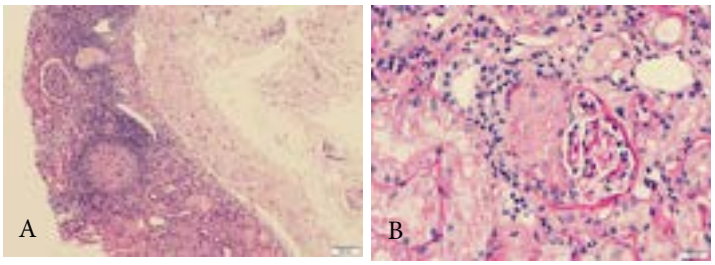

Fig 1.

(A) Part of the Renal biopsy showing global glomerulosclerosis, an intact viable glomerulus and an epithelioid granuloma H&E, 40x (B) A glomerulus showing segmental sclerosis, Periodic acid-Schiff 20x

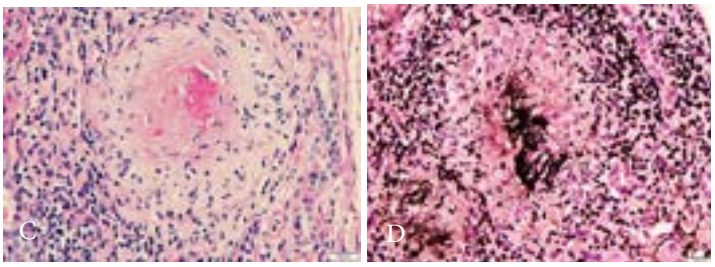

Fig 2.(C&D) Non-necrotizing epithelioid granuloma centered on remnants of glomeruli,

Periodic acid-Schiff 40X and Methenamine Silver 40X

FINAL DIAGNOSIS

Wegener's Granulomatosis@ Granulomatosis Polyangiitis (GPA)

LEARNING POINTS

1. Recurrent chest infections with concurrent AKI indeed raise suspicion for pulmonary-renal syndromes, which encompass a group of disorders characterised by both pulmonary and renal involvement, such as Goodpasture syndrome, ANCA-associated vasculitis, and systemic lupus erythematosus (SLE).
2. Prompt renal biopsy can be crucial in cases where the cause of AKI is uncertain as it provides histological evidence to guide diagnosis and treatment decisions.
3. Interpreting immunological panels in the context of clinical correlation is essential for accurate diagnosis as these tests can have false-positive or false-negative results. Repeated testing may be warranted if initial results are inconclusive or discordant with clinical presentation.

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