

Title: *Post-Haematopoietic Stem Cell Transplant Nephrotic Syndrome: A Single-centre experience of histological patterns, management and outcomes*

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Background: Nephrotic syndrome(NS) is a rare but recognised complication of haematopoietic stem cell transplantation(HSCT) and is frequently associated with graft-versus-host disease(GVHD). Owing to its rarity, real-world data remain limited.

Aim: To review clinical presentation, renal histology, degree of proteinuria, serum albumin, treatment strategies and outcomes in patients with post-HSCT NS at a tertiary UK centre.

Methods: We performed a retrospective review of all patients diagnosed with NS after HSCT between March 2012 and December 2025 at a tertiary nephrology and haemato-oncology centre. Data collected included demographics, underlying haematological diagnosis, transplant characteristics, GVHD status, renal histology, urine protein-creatinine ratio(UPCR), serum albumin, kidney function at NS diagnosis, treatment and clinical outcomes.

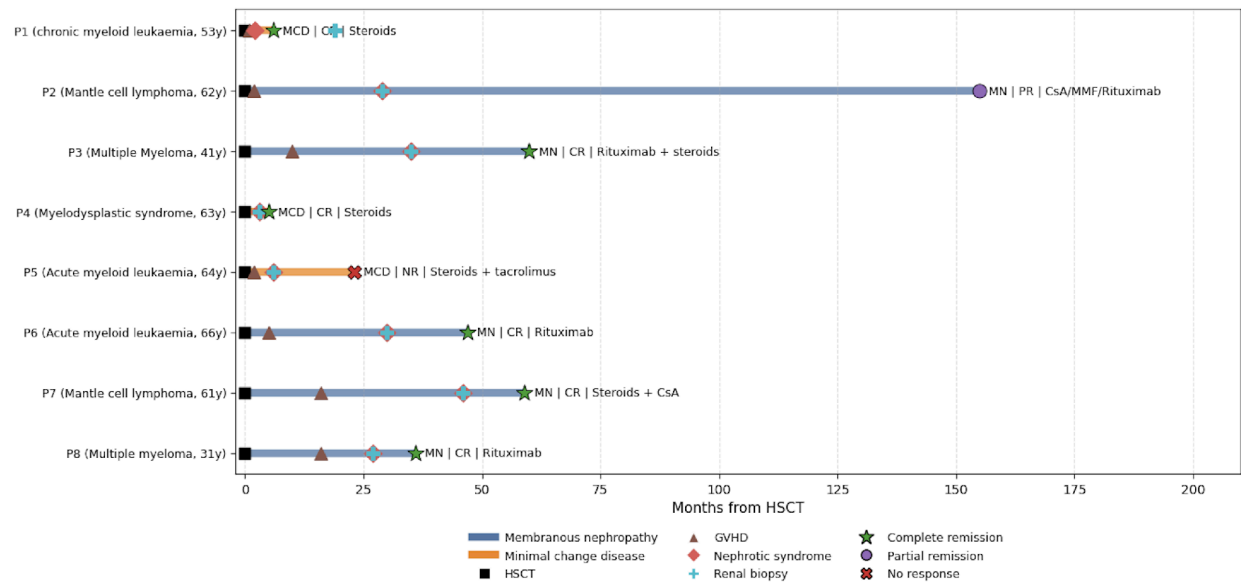
Results: Eight patients were identified. Median age at NS diagnosis was 63 years(range 31–66 years), and seven patients (87.5%) had preceding or concurrent GVHD. Renal biopsy demonstrated membranous nephropathy(MN) in five patients(62.5%) and minimal change disease(MCD) in three (37.5%). Only one patient with MN had positive PLA2R antibodies. Median UPCR at diagnosis was 933.5 mg/mmol (range 448–1283 mg/mmol). Compared with MN, patients with MCD had greater proteinuria (median UPCR 1039 vs 828 mg/mmol) and lower serum albumin concentrations(18 vs 22 g/L). Renal function at diagnosis ranged from severe impairment to preserved kidney function(eGFR 10 to >90 ml/min/1.73m²). Treatment included corticosteroids, calcineurin inhibitors, mycophenolate mofetil and rituximab, with rituximab used predominantly in MN. Five patients(62.5%) achieved complete remission, two (25.0%) achieved partial remission and one patient(12.5%) with MCD and severe renal impairment demonstrated no response to therapy.

Conclusions: Post-HSCT NS is an uncommon manifestation of post-transplant immune dysregulation. MN was the predominant histological diagnosis and was strongly associated with GVHD. Although patients with MCD presented with greater proteinuria and more severe hypoalbuminaemia, favourable renal outcomes were achieved in most patients following immunosuppressive therapy. Renal biopsy remains essential for diagnosis, prognostication and guiding treatment.

Table 1. Baseline characteristics, renal histology, treatment and clinical outcomes of patients developing nephrotic syndrome following haematopoietic stem cell transplantation

Variable	Number(%)
Number of patients	8
Median age at NS diagnosis	62.5 years
Female	3 (37.5%)
GVHD	7 (87.5%)
Membranous nephropathy	5 (62.5%)
Minimal change disease	3 (37.5%)
Median UPCR	933.5 mg/mmol
Median serum albumin	20 g/L
Median eGFR	55 ml/min/1.73m ²
Complete remission	5 (62.5%)
Partial remission	1 (12.5%)
No response	1 (12.5%)
Rituximab use	4 (50%)

Figure 1. The clinical course, histological patterns, treatment and outcomes of patients with post-haematopoietic stem cell transplant nephrotic syndrome



The image illustrates the temporal relationship between haematopoietic stem cell transplantation (HSCT), graft-versus-host disease (GVHD), onset of nephrotic syndrome (NS), renal biopsy, treatment and clinical outcomes. Blue lines represent membranous nephropathy (MN) and orange lines represent minimal change disease (MCD). Symbols denote key clinical events including HSCT, GVHD, NS diagnosis, renal biopsy and remission status. Lines are scaled from HSCT to complete remission where achieved; patients with partial remission or no response are followed until the end of the audit period (31 December 2025).