

Coexistence of dermatomyositis, bullous pemphigoid, and membranous nephropathy in a patient with type 2 diabetes mellitus: a case report

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Case Report

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Abstract

Background: Dermatomyositis is an idiopathic inflammatory myopathy that can involve multiple organ systems. However, its coexistence with bullous pemphigoid and membranous nephropathy is extremely rare, and no cases with concurrent diabetes mellitus have been reported to date. We present a rare case of dermatomyositis complicated by bullous pemphigoid, stage II membranous nephropathy, and diabetic ketosis, and discuss the clinical features, diagnostic and therapeutic course, and outcomes of combined immunosuppressive therapy.

Case presentation: A 55-year-old male patient presented with generalized erythema, papules, and pruritus for over 2 months, having visited multiple hospitals without a definitive diagnosis. Upon admission, marked hyperglycemia and positive urinary ketones were noted; the endocrinology department diagnosed diabetic ketosis. Further investigations revealed positive anti-Jo-1 antibodies, massive proteinuria (24-hour urinary protein 7.5 g), hypoalbuminemia (20.1 g/L), and renal dysfunction (serum creatinine 106 μ mol/L). After transfer to our department, myositis antibody profiling demonstrated dual positivity for anti-Jo-1 and anti-PM-SCL100 antibodies. Skin biopsy with direct immunofluorescence showed linear IgG and C3 deposition along the basement membrane zone, and renal biopsy confirmed stage II membranous nephropathy. Serum anti-PLA2R antibody and renal tissue PLA2R/THSD7A staining were both negative, supporting a secondary etiology of membranous nephropathy. The patient was diagnosed with dermatomyositis, bullous pemphigoid, stage II membranous nephropathy, and diabetes mellitus. He was treated with methylprednisolone combined with mycophenolate mofetil, tacrolimus, and hydroxychloroquine, along with intensive glycemic control. At 10-week follow-up, 24-hour urinary protein decreased to 0.26 g, serum albumin increased to 36.3 g/L, serum creatinine was 98 μ mol/L, skin lesions completely resolved with no residual pruritus, and glycemic control was stabilized (HbA1c decreased from 9.5% to 6.2%). No severe adverse events occurred.

Conclusions: This case represents a previously unreported coexistence of dermatomyositis with bullous pemphigoid, stage II membranous nephropathy, and diabetic ketosis. The combination regimen of glucocorticoids, mycophenolate mofetil, tacrolimus, and hydroxychloroquine demonstrated favorable efficacy and safety for this complex overlap syndrome. This case suggests that in dermatomyositis patients presenting with bullous skin lesions or massive proteinuria, active screening for overlapping autoimmune skin disorders and glomerular diseases is warranted, and early combined immunosuppressive therapy may improve outcomes.

Introduction

Dermatomyositis (DM) is an idiopathic inflammatory myopathy characterized by symmetric proximal muscle weakness and distinctive cutaneous manifestations, including heliotrope rash and Gottron's papules (1, 2). DM can involve multiple organ systems, though renal involvement is relatively uncommon among connective tissue diseases, with membranous nephropathy (MN) being particularly rare (3). DM

may also overlap with bullous pemphigoid (BP), an autoimmune subepidermal bullous disease mediated by autoantibodies against BP180 and BP230. The coexistence of DM and BP has been reported only sporadically in the literature (4). Additionally, the association between MN and BP has been documented, suggesting a possible shared immunological basis (5).

Diabetes mellitus is a common comorbidity in DM patients, with a reported prevalence as high as 23.6% in one cohort study (6). This dual burden of autoimmune disease and metabolic disorder poses substantial challenges for clinical management, particularly when glucocorticoids—the mainstay of DM therapy—can themselves induce or exacerbate glycemic dysregulation.

The simultaneous occurrence of DM, BP, MN, and diabetes in a single patient is exceptionally rare, and to our knowledge, no such case has been reported to date. This rare combination not only reflects a convergence of multiple autoimmune disorders in one individual but also presents substantial therapeutic dilemmas: how to balance immunosuppressive therapy for autoimmune diseases with renal protection for MN? How to concurrently manage the blistering lesions of BP and the characteristic skin manifestations of DM? How to achieve a dynamic equilibrium between immunosuppressive treatment and the control of diabetes and its complications?

We report a case of DM with concurrent BP, stage II MN, and diabetic ketosis, and discuss the clinical features, diagnostic and therapeutic course, and management strategies in the context of multiple comorbidities, aiming to provide a reference for the clinical management of such rare and complex cases.

Case Presentation

A 55-year-old male patient presented with a 2-month history of scattered generalized erythema and papules accompanied by intense pruritus without obvious precipitating factors. The skin lesions initially appeared on the trunk and proximal extremities, then gradually spread to the whole body. He had visited several hospitals where the lesions were diagnosed as “eczema,” “allergic dermatitis,” or “urticaria,” and was treated with antihistamines (loratadine, cetirizine, etc.) and topical glucocorticoid ointments. However, the symptoms did not improve; the rash progressively enlarged, with some lesions coalescing into plaques and developing blister-like changes. During the disease course, he developed oedema of the four limbs that did not resolve spontaneously. Because of the persistent worsening of symptoms, he was admitted to our Department of Dermatology.

Physical examination revealed: dry and rough skin over the entire body, with patchy erythema on the face, neck, trunk, extremities, and scrotum; pinpoint- to millet-sized papules on the erythematous areas; extensive white dry scales with numerous bloody crusts and excoriations; fissures over some erythematous areas; marked swelling of all four limbs; mild scrotal swelling with slight exudation; and partial skin ulceration without erosion (Figure 1). Musculoskeletal examination showed proximal muscle strength of 5–/5 in the upper extremities (shoulder abduction, elbow flexion) and 4/5 in the lower

extremities (hip flexion, knee extension); distal muscle strength was 5/5 bilaterally; no muscle tenderness was noted.

On admission, fasting blood glucose was markedly elevated, and urinalysis revealed positive ketones and glucose (Table 1). Endocrinology consultation suggested a diagnosis of “diabetic ketosis.” Further investigations (Table 1) demonstrated positive anti-Jo-1 antibodies, severely decreased serum albumin, massive proteinuria, and elevated serum creatinine. Given the presence of myositis-specific antibodies, massive proteinuria, and renal dysfunction, the patient was transferred to our Department of Nephrology and Rheumatology for further evaluation.

Additional diagnostic work-up after transfer included:

Myositis antibody profile: positive for anti-Jo-1 and anti-PM-SCL100 antibodies.

Skin and subcutaneous fat biopsy: epidermal hyperplasia with hyperkeratosis and parakeratosis, spongiosis in the stratum spinosum, and perivascular lymphocytic and eosinophilic infiltration in the superficial and mid-dermis. Direct immunofluorescence (DIF) demonstrated linear C3 deposition (positive) and linear weak IgG deposition along the epidermal basement membrane zone; IgA, IgM, and fibrinogen were negative. Special stains: Congo red (–), methyl violet (–); melanin stain showed melanin granules deposited in the epidermal basal layer; Alcian blue (–). Immunohistochemistry: CD2, CD3, CD5, CD4, CD8, CD7, and CD20 demonstrated T-and B-lymphocyte infiltration with T-cell predominance; CD30 (–), PD1 (–), Ki-67 ~20% positive, CD25 scattered positive, CK5/6 positive in epithelium, TCRβF1 positive. These findings did not support a diagnosis of mycosis fungoides. In conjunction with the DIF results, bullous pemphigoid was considered (Figure 2).

Renal biopsy: histology showed vacuolar and granular degeneration of tubular epithelial cells, focal tubular atrophy (approximately 10% of the tubulointerstitial area), scattered inflammatory cell infiltration with mild interstitial fibrosis, and arteriolar wall thickening with luminal narrowing. Congo red and oxidized Congo red stains were negative. Immunofluorescence revealed fine granular IgG deposition along the glomerular capillary loops. Serum anti-PLA2R antibody and renal tissue PLA2R/THSD7A staining were both negative. Electron microscopy demonstrated segmental homogeneous thickening of the glomerular basement membrane, diffuse foot process fusion (>95%), and subepithelial and intramembranous electron-dense deposits with basement membrane reaction. The pathological diagnosis was stage II membranous nephropathy (Figure 3).

Based on the above findings, the following diagnoses were established:

Dermatomyositis (anti-Jo-1 and anti-PM-SCL100 antibody double-positive);

Bullous pemphigoid;

Stage II membranous nephropathy;

Type 2 diabetes mellitus with diabetic ketosis.

After diagnosis, combined immunomodulatory therapy was initiated:

Glucocorticoid: methylprednisolone 48 mg/day orally, tapered starting at 6 weeks, with a reduction of 4 mg every 2 weeks.

Mycophenolate mofetil (MMF): mycophenolate mofetil dispersible tablets 500 mg twice daily (dose adjusted according to trough levels).

Calcineurin inhibitor: tacrolimus capsules 1.5 mg twice daily (dose adjusted according to trough levels).

Hydroxychloroquine: hydroxychloroquine sulfate tablets 200 mg twice daily.

Adjunctive therapies included glycemic control, proteinuria reduction, gastric mucosal protection, and osteoporosis prophylaxis.

Following the above treatment, the patient showed marked clinical improvement:

Skin lesions: at 2 weeks, pruritus was markedly alleviated and skin lesions gradually decreased with crusting; at 6 weeks, most of the original skin lesions had resolved with no new lesions (Figure 4).

Muscle strength: recovered to 5/5 in both upper and lower extremities; the patient could walk independently and climb stairs.

Oedema: completely resolved in both lower extremities.

Quality of life: the patient regained physical strength with no new discomfort.

Laboratory parameters: serum albumin progressively increased, urinary protein significantly decreased, and blood glucose was well controlled (Table 2).

This case represents a rare multisystem autoimmune overlap syndrome of dermatomyositis with bullous pemphigoid, stage II membranous nephropathy, and diabetic ketosis. Following combined immunosuppressive therapy with glucocorticoids, mycophenolate mofetil, tacrolimus, and hydroxychloroquine, along with intensive glycemic control, the patient achieved comprehensive treatment responses within 10 weeks of follow-up, including resolution of skin lesions, increased serum albumin, marked reduction in proteinuria, and recovery of muscle strength (Table 3, Figure 5). No significant adverse events such as infection, glycemic fluctuation, hepatotoxicity, or myelosuppression were observed during follow-up. The clinical course indicates that this combination regimen has favourable efficacy and safety for complex overlap autoimmune syndromes (diagnostic and therapeutic workflow is shown in Figure 6).

Discussion

We report a rare case of dermatomyositis (DM) complicated by bullous pemphigoid (BP), stage II membranous nephropathy (MN), and diabetic ketosis. Following treatment with glucocorticoids combined with mycophenolate mofetil (MMF), tacrolimus, and hydroxychloroquine, the patient achieved resolution of skin lesions, recovery of muscle strength, marked reduction in proteinuria, gradual increase in serum albumin, and stabilisation of blood glucose. Herein, we discuss the rarity of this case, potential pathogenic mechanisms, treatment rationale, and comparison with previously reported cases.

Rarity of the case

Overlap of DM and BP. The coexistence of DM and BP has been infrequently reported. BP is an autoimmune subepidermal bullous disease that can co-exist with various immune-mediated disorders, including psoriasis, vitiligo, inflammatory bowel disease, autoimmune thyroid disease, and rheumatic diseases such as rheumatoid arthritis, DM, systemic sclerosis, and systemic lupus erythematosus (7). However, the concurrent presentation is uncommon; the paucity of reports may reflect misdiagnosis, underreporting, or a genuinely rare association (8). Our patient presented with classic DM features (heliotope rash, Gottron's papules, proximal muscle weakness, anti-Jo-1 positivity) and pathological evidence of BP (subepidermal blisters, linear IgG and C3 along the basement membrane zone), confirming the overlap. When bullous lesions occur in DM, clinicians should consider "bullous DM," which is often a warning sign of underlying malignancy (9–11). Adults with DM have an increased malignancy risk; a meta-analysis identified older age, male sex, cutaneous necrosis, and elevated ESR and CRP as risk factors (12). However, our patient underwent comprehensive tumour screening (AFP, CEA, CA19-9, CA125 all normal) with no evidence of malignancy, confirming coexisting DM and BP rather than a paraneoplastic manifestation.

DM with MN. Renal involvement is uncommon in DM, and MN is among the rarest pathological types. Akashi et al. reported a patient who developed MN 8 years after DM diagnosis, explicitly noting the extreme rarity of this association and highlighting the correlation between CA125 levels and proteinuria (13). In contrast, our patient presented with four concurrent conditions and normal CA125 levels.

DM and diabetes. In our patient, diabetes was not merely a treatment complication but a risk inherent to DM. In a cohort of 434 adults with DM (6), diabetes prevalence was 23.6% vs. 10.5% in matched controls; even after adjusting for glucocorticoid use, DM itself conferred a 7% increased diabetes risk, suggesting an intrinsic association. In that cohort, 41% were diagnosed with diabetes after DM (6). A Chinese study of 223 DM patients reported a diabetes prevalence of 5.8% (14). These findings support DM as an independent risk factor for diabetes.

Extreme rarity of the four-disease overlap. To date, no case of DM, BP, MN, and diabetes occurring simultaneously has been reported. The value of this case lies not only in its rarity but also in its demonstration of converging autoimmune disorders compounded by diabetes, which complicates clinical decision-making.

Potential pathogenic mechanisms

Generalised humoral immune dysregulation. Our patient simultaneously produced anti-Jo-1, anti-PM-SCL100, and MN-associated immunoglobulin deposits, suggesting widespread immune activation rather than a restricted response to a single antigen. Over 70% of myositis patients have detectable circulating immune complexes (15,16), which can deposit in various tissues, including glomeruli. The marked hypoalbuminaemia (20.1 g/L) and massive proteinuria (7.5 g/24 h), together with electron microscopic findings of subepithelial immune complex deposition, are consistent with this mechanism.

The "epitope spreading" hypothesis. The concurrent occurrence of DM and BP may relate to basement membrane zone antigen exposure from DM-induced skin damage. A study reported a patient with clinically amyopathic DM who developed BP days after using a local heat patch (11), and proposed that local skin injury may expose previously "hidden" basement membrane antigens, triggering pathogenic autoantibody production. This hypothesis may partially explain why some DM patients develop autoimmune bullous diseases.

Secondary MN: negative serum anti-PLA2R and renal tissue PLA2R/THSD7A. Our patient tested negative for serum anti-PLA2R antibodies, and renal tissue staining for PLA2R and THSD7A was also negative. PLA2R is the major target antigen in primary MN (17), with 70~80% of primary MN patients positive for serum anti-PLA2R antibodies (18–20), and renal PLA2R positivity having >95% specificity for primary MN (20). THSD7A accounts for 1–5% of primary MN cases (20–22). The dual negativity, in the context of active DM and BP, effectively excludes primary MN and strongly supports a secondary aetiology. Both DM and BP are immune complex-mediated diseases, and circulating immune complex deposition along the glomerular basement membrane is the most likely mechanism.

Genetic susceptibility and environmental triggers. In autoimmune diseases, genetic susceptibility and environmental factors often act synergistically. Two cases of concurrent juvenile DM and diabetes have been reported, with investigators suggesting that a common environmental trigger, possibly a viral infection, may cause distinct autoimmune pathologies in genetically susceptible individuals (23). A similar mechanism may underlie our patient's multi-system immune dysregulation.

Treatment strategy

Our treatment strategy followed the principle of "immunosuppression as the mainstay, multi-target coverage as the core, and metabolic regulation as a concurrent priority."

Glucocorticoids. Glucocorticoids are the cornerstone for DM and BP in both acute and maintenance phases; for MN, they are primarily used during induction to rapidly control proteinuria. However, our patient had concurrent diabetic ketosis. Hyperglycaemia can impair wound healing and increase infection risk. Several reviews have linked hyperglycaemia to oxidative stress, advanced glycation end-product formation, endothelial damage, and pro-inflammatory cytokine signalling (24,25), which may exacerbate DM skin lesions (24). Therefore, we prioritised insulin pump therapy for intensive glycaemic control during the ketotic phase and initiated systemic glucocorticoids only after glucose stabilised,

reflecting the approach of "controlling the reversible metabolic emergency first, then managing the underlying immune disease."

MMF. MMF, a selective inhibitor of purine metabolism, is effective for DM skin and muscle involvement (26,27) and for BP (28). We chose MMF for three reasons: (1) it provides multi-target effects- anti-dermatitis, anti-myositis, and anti-glomerular immune deposition-matching the widespread immune dysregulation; (2) it lacks the significant metabolic side effects of glucocorticoids, making it suitable for diabetic patients; and (3) its combination with tacrolimus provides synergistic T-cell and B-cell pathway blockade (29,30).

Tacrolimus. Tacrolimus inhibits calcineurin-dependent T-cell activation. We added it for two reasons: (1) BP pathogenesis involves T-cell-dependent B-cell production of anti-BP180 antibodies, and T-cell inhibition is crucial for disease control (31,32); and (2) tacrolimus and MMF have complementary mechanisms, providing synergistic T-cell and B-cell blockade (29,30).

Hydroxychloroquine. Hydroxychloroquine has clear benefits for DM skin manifestations (33), potential protective effects against diabetes risk (34), and immunomodulatory functions (35), making it an attractive adjunctive agent. In addition, DPP-4 inhibitors are important triggers for BP in diabetic patients and should be avoided (36,37). The 10-week outcomes-muscle strength recovery to grade 5, proteinuria reduction from 7.5 g to 0.26 g, near-normalisation of renal function, well-controlled glucose, and complete skin resolution-support the efficacy of this multi-target regimen.

Comparison with previously reported cases

A systematic literature review revealed that two-disease or three-disease combinations have been reported, but no complete case of all four conditions in the same patient has been documented. A comparison is summarised in Table 4.

Table 4. Comparison of the present case with previously reported disease combinations

Disease combination	Literature evidence	Differences from the present case
DM + BP	Case report (Front. Immunol., 2022 (11)) and review confirming the coexistence	MN not mentioned
DM + MN	43-year-old female who developed MN 8 years after DM diagnosis (Am J Nephrol., 2002 (13))	BP not involved; different timing
DM + MN (paediatric)	10-year-old boy with Clq deposition (Turk J Pediatr., 2001 (38))	BP and diabetes not involved
BP + MN	Kidney transplant recipient with BP, acute allograft rejection, and de novo MN (Clin Case Rep., 2018 (39))	DM not involved
Paraneoplastic pemphigus + myasthenia gravis + MN	"Triple syndrome" driven by dendritic cell sarcoma (JASN, 2025 (40))	Different driving force and core disease spectrum
BP + diabetes	DPP-4 inhibitor-induced (Diabetes Care review, 2011(41))	Diabetes preceded drug exposure in our case
Present case: DM + BP + secondary MN + diabetes	Serum anti-PLA2R negative; renal tissue PLA2R/THSD7A negative; dual confirmation of secondary MN	First reported case of four-disease overlap with exclusion of common primary MN antigens

Collectively, this case presents a unique clinical picture of “four-disease overlap without paraneoplastic aetiology,” which, to our knowledge, has not been reported globally--this constitutes the core publication value of this report.

Limitations

Several limitations should be considered when interpreting the findings. First, the follow-up duration is only 10 weeks. Although short-term efficacy was significant, long-term prognosis remains uncertain. DM, BP, and MN are all relapsing chronic autoimmune diseases; the long-term remission rate, relapse rate, feasibility of glucocorticoid tapering, and long-term renal function preservation with this combination regimen require further validation with extended follow-up (at least 12~24 months).

Second, the aetiology of MN has been confirmed as secondary, though the possibility of other rare antigens cannot be completely excluded. Our patient tested negative for serum anti-PLA2R antibodies, and renal tissue staining for PLA2R and THSD7A was also negative. This dual negativity strongly excludes primary MN mediated by PLA2R or THSD7A, and in the context of active DM and BP, supports a secondary aetiology. However, we cannot entirely rule out the theoretical possibility of MN mediated by other rare target antigens, such as NELL-1, Exostosin 1/2, Semaphorin 3B, or PCDH7 (21), which were not tested in this case. Nonetheless, in the setting of active autoimmune disease with the most common

primary antigens excluded, the clinical diagnosis of secondary MN is well supported, and this limitation is largely theoretical.

Third, the patient received a four-drug combination regimen (glucocorticoids, MMF, tacrolimus, and hydroxychloroquine). Although the treatment response was favourable, the individual contribution of each agent to the overall efficacy cannot be determined. Whether one agent played a dominant role, others were adjunctive, or all four were indispensable remains unknown. Furthermore, combination therapy complicates the assessment of adverse drug reactions; although no serious events were observed during follow-up, long-term safety requires vigilance.

Fourth, muscle biopsy was not performed. The diagnosis of DM was based on typical cutaneous findings (heliotrope rash, Gottron's papules), proximal muscle weakness, elevated muscle enzymes, and anti-Jo-1 antibody positivity. Although these clinical and serological findings strongly support the diagnosis, the lack of pathological confirmation (e.g., perifascicular atrophy, inflammatory infiltration) remains a diagnostic limitation.

Fifth, the patient presented with diabetic ketosis at the time of DM diagnosis, but the diabetes subtype (type 1 vs. type 2) and its temporal relationship with DM—whether it predated DM or was induced by DM-related immune dysregulation—could not be determined. This limits in-depth exploration of the pathogenic link between the two conditions.

Sixth, as a single case report, the treatment experience and conclusions are not directly generalisable to all similar patients. Responses to immunosuppressive regimens may vary significantly among individuals; further case accumulation or case series are needed to validate the generalisability of this regimen. Finally, as a retrospective case report, some clinical data (e.g., detailed initial physical examination records, results from outside hospitals) were not fully available, which may introduce information bias.

Clinical implications and future directions

This case offers several clinical lessons. In DM patients presenting with bullous skin lesions or massive proteinuria, active screening for coexisting BP and glomerular diseases is warranted. The presence of multiple autoimmune diseases is not a contraindication to immunosuppressive therapy; with multidisciplinary collaboration, combined immunosuppressive regimens can achieve favourable disease control. Diabetes, as a common comorbidity, should be managed throughout the entire treatment course.

Further work is planned to validate and extend our findings: (1) extended follow-up (at least 12~24 months) to assess long-term efficacy, relapse rate, and drug safety; (2) testing for other rare MN-associated antigens (e.g., NELL-1, Exostosin 1/2) to further exclude other primary antigen-mediated MN; (3) muscle biopsy if feasible to strengthen the diagnostic evidence for DM; and (4) exploration of

immunological parameters, including T-cell subsets and cytokine profiles, to elucidate the immunological mechanisms underlying this multiple autoimmune overlap syndrome.

Conclusions

We report a case of a multiple overlap autoimmune syndrome comprising dermatomyositis, bullous pemphigoid, stage II membranous nephropathy, and diabetic ketosis. To our knowledge, no complete case report of these four conditions occurring simultaneously in the same patient has been published in the literature, underscoring the extreme rarity and academic value of this case.

This case demonstrates that multiple autoimmune disorders can coexist and interact in a single individual, reflecting a complex immunopathological state. Dermatomyositis, bullous pemphigoid, and membranous nephropathy all involve humoral immune abnormalities and immune complex-mediated tissue injury, with diabetes further complicating clinical management. This case suggests that the "generalisation" of autoimmune diseases may be more extensive than commonly recognised.

The patient tested negative for serum anti-PLA2R antibodies, and renal tissue staining for PLA2R and THSD7A was also negative. PLA2R is the major target antigen in primary membranous nephropathy, and THSD7A accounts for a small proportion of primary cases. This dual negativity effectively excludes primary membranous nephropathy mediated by these antigens, and in the context of active dermatomyositis and bullous pemphigoid, strongly supports a secondary aetiology. This finding unifies the four diseases immunopathologically: dermatomyositis, bullous pemphigoid, and secondary membranous nephropathy all share immune complex/autoantibody-mediated tissue injury, while diabetes serves as a significant metabolic comorbidity. Thus, the PLA2R/THSD7A dual negativity not only robustly excludes the corresponding primary membranous nephropathy but also reinforces the diagnostic chain of "multi-system autoimmune disease with secondary glomerular injury."

In terms of treatment, this case validates the efficacy and safety of a multi-target immunosuppressive regimen combining glucocorticoids, mycophenolate mofetil, tacrolimus, and hydroxychloroquine for this complex overlap syndrome. This regimen achieved significant responses in controlling myositis and skin lesions, promoting bullous healing, reducing proteinuria, and improving renal function, without inducing serious infections or metabolic decompensation. Intensive insulin therapy played a critical role in managing diabetic ketosis.

Several limitations should be acknowledged. The follow-up duration is only 10 weeks, and long-term prognosis remains unknown. Although serum anti-PLA2R and renal tissue PLA2R/THSD7A staining were both negative, strongly supporting secondary membranous nephropathy, other rare primary antigens (e.g., NELL-1, Exostosin 1/2) were not tested. The combined regimen does not allow determination of each drug's individual contribution. Muscle biopsy was not performed. The diabetes subtype and its temporal relationship with dermatomyositis could not be definitively established. As a single case report, the findings are not directly generalisable, and the retrospective nature may introduce information bias. These limitations should be addressed in future studies. Nevertheless, it is important to emphasise that

the aetiology of membranous nephropathy has been robustly established as secondary through both serological and histological exclusion of the most common primary antigens (PLA2R and THSD7A), substantially strengthening the diagnostic evidence.

In summary, this case provides detailed clinical data and therapeutic experience for the rare overlap syndrome of dermatomyositis with bullous pemphigoid, secondary membranous nephropathy, and diabetes, and establishes the secondary nature of membranous nephropathy through PLA2R/THSD7A dual negativity. Despite the limitations, this case enriches the understanding of such complex diseases and offers valuable reference for clinical management. Future case accumulation and long-term follow-up data are awaited to further optimise diagnostic and therapeutic strategies for multiple autoimmune overlap syndromes.

Abbreviations

ALT:Alanine aminotransferase

ANA:Antinuclear antibody

AST:Aspartate aminotransferase

BP:Bullous pemphigoid

CK:Creatine kinase

Cr:Creatinine

DM:Dermatomyositis

DIF:Direct immunofluorescence

DPP-4:Dipeptidyl peptidase-4

eGFR:Estimated glomerular filtration rate

H&E:Haematoxylin and eosin

HbA1c:Glycated haemoglobin

HCQ:Hydroxychloroquine

LDH: Lactate dehydrogenase

MMF:Mycophenolate mofetil

MN:Membranous nephropathy

PAS:Periodic acid-Schiff

PASM:Periodic acid-silver methenamine

PLA2R:Phospholipase A2 receptor

TAC:Tacrolimus

THSD7A:Thrombospondin type-1 domain-containing 7A

UPCR:Urinary protein-to-creatinine ratio

Declarations

Ethics approval and consent to participate

This case report was conducted in accordance with the principles of the Declaration of Helsinki. As this was a retrospective descriptive study involving only the collection and analysis of routine clinical data without any additional interventional procedures or biological sample collection, formal ethical approval was waived by the Institutional Review Board of our hospital. Nevertheless, we have strictly adhered to all regulations regarding patient privacy protection.

Consent for publication

Written informed consent was obtained from the patient for the publication of this case report, including clinical data, laboratory findings, and images. The patient was informed that although all identifiable personal information would be removed during the publication process, complete anonymity could not be absolutely guaranteed. The patient understood that they had the right to withdraw consent at any time. A copy of the written consent is available for review by the Editorial Office.

Competing interests

All authors declare that they have no competing interests. The writing and publication of this case report were not influenced by any commercial or financial relationships.

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Authors'contributions

Chen MM contributed to patient management, data collection, literature review, drafting of the initial manuscript, patient care, and interpretation of pathological findings. Luo XS participated in patient care, key clinical decision-making, pathological diagnosis, result analysis, and manuscript revision. Liang JS

contributed to study design, overall supervision, and critical revision of the manuscript for important intellectual content. All authors reviewed and approved the final submitted version.

Availability of data and materials

All clinical data supporting the findings of this case report are included within the article and its accompanying figures. The original clinical records and laboratory reports are available from the corresponding author upon reasonable request. Identifiable personal information has been removed to protect patient privacy.

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Tables

Tables 1 to 3 are available in the Supplementary Files section.

Figures



Figure 1

Cutaneous manifestations on admission.

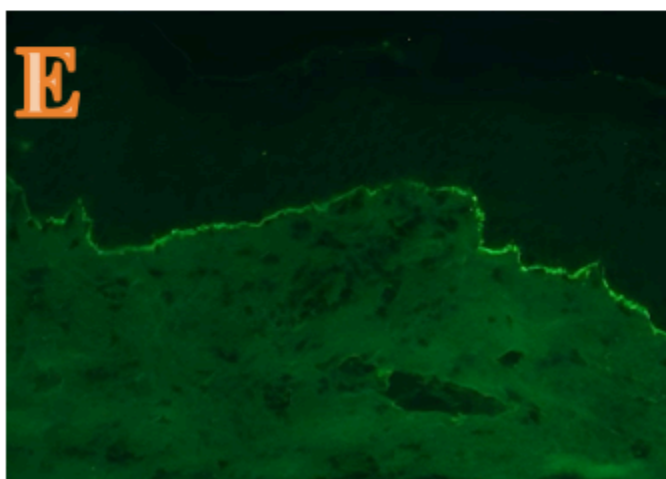
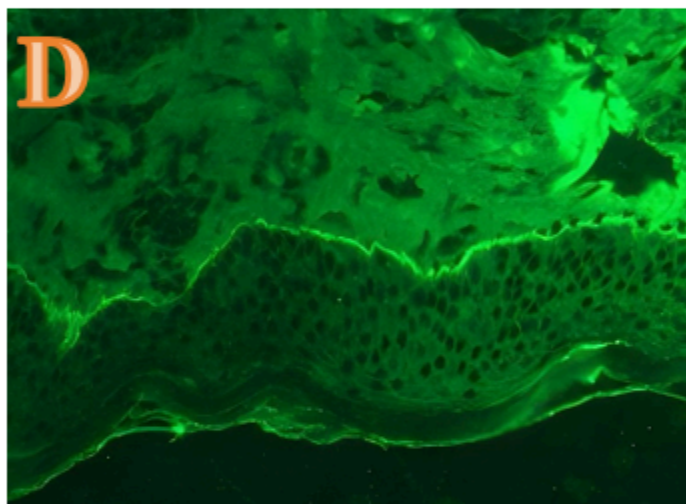
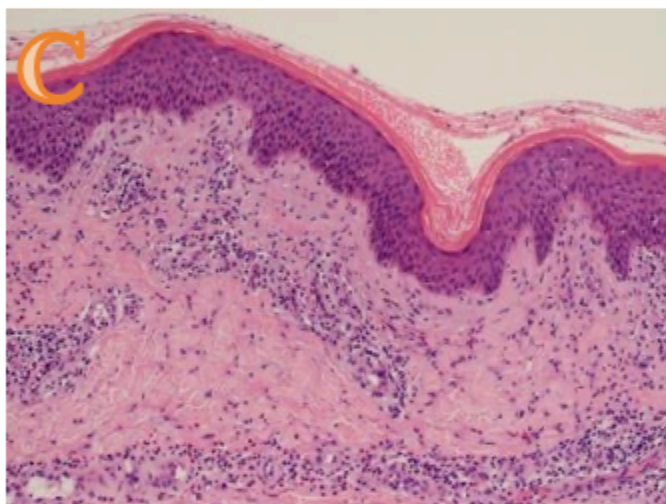
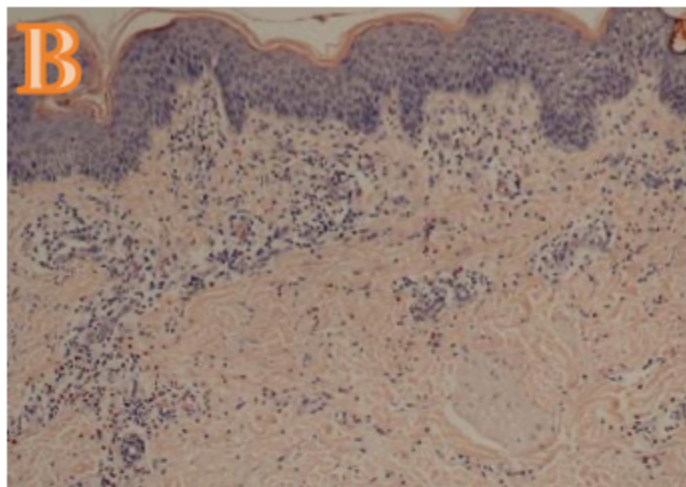
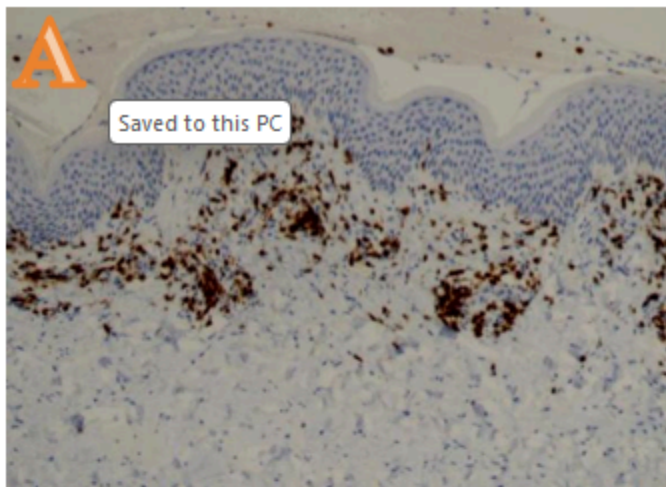


Figure 2

Skin histopathology, immunohistochemistry, and direct immunofluorescence findings.

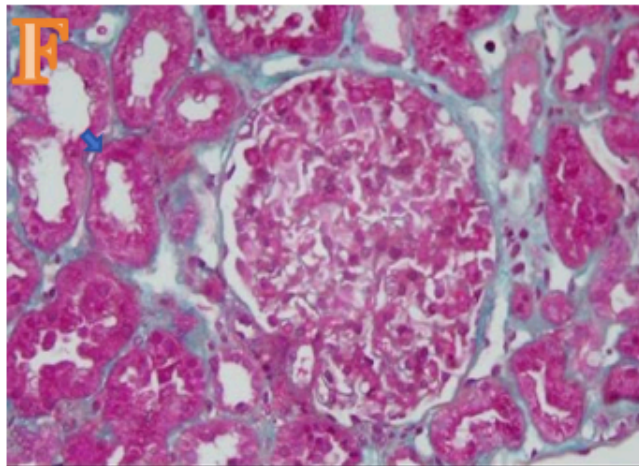
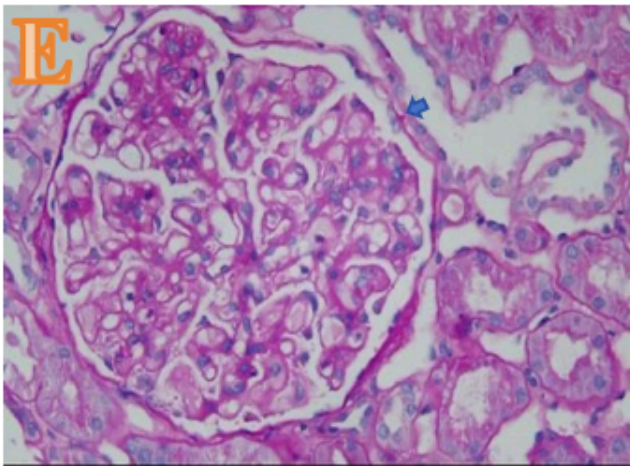
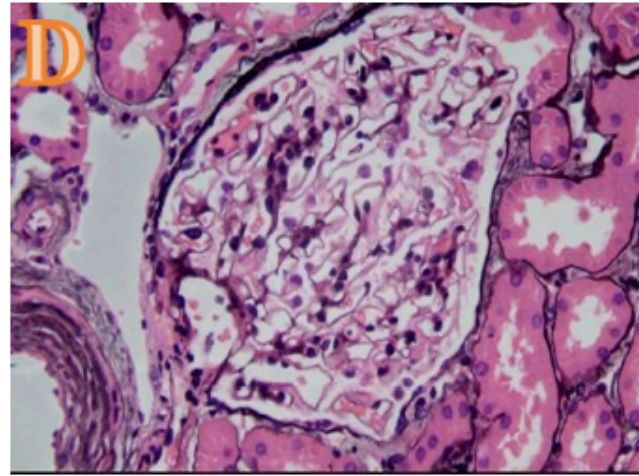
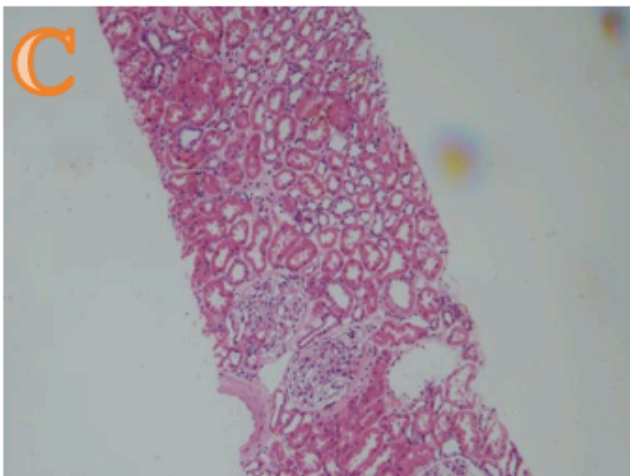
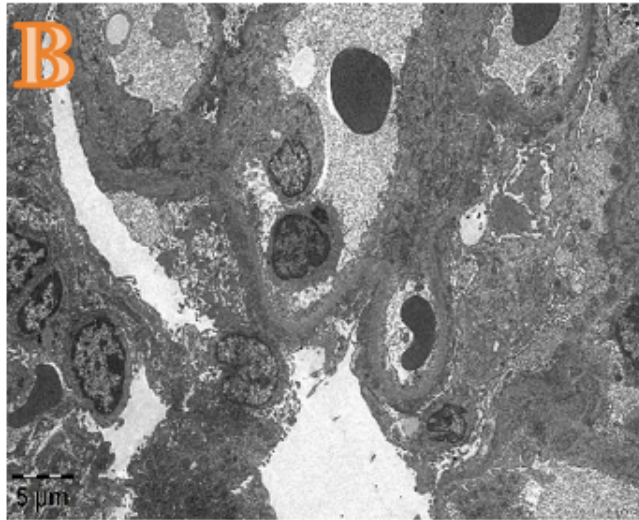
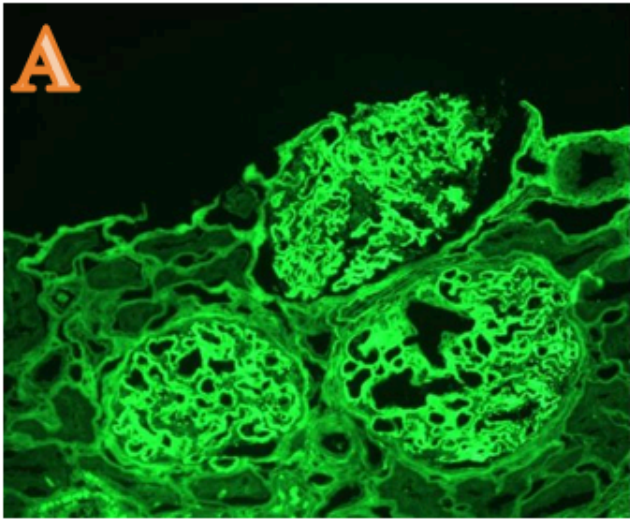


Figure 3

Renal biopsy findings.



Figure 4

Lesion healing after treatment (6 weeks).



Figure 5

Lesion healing after treatment (10 weeks).

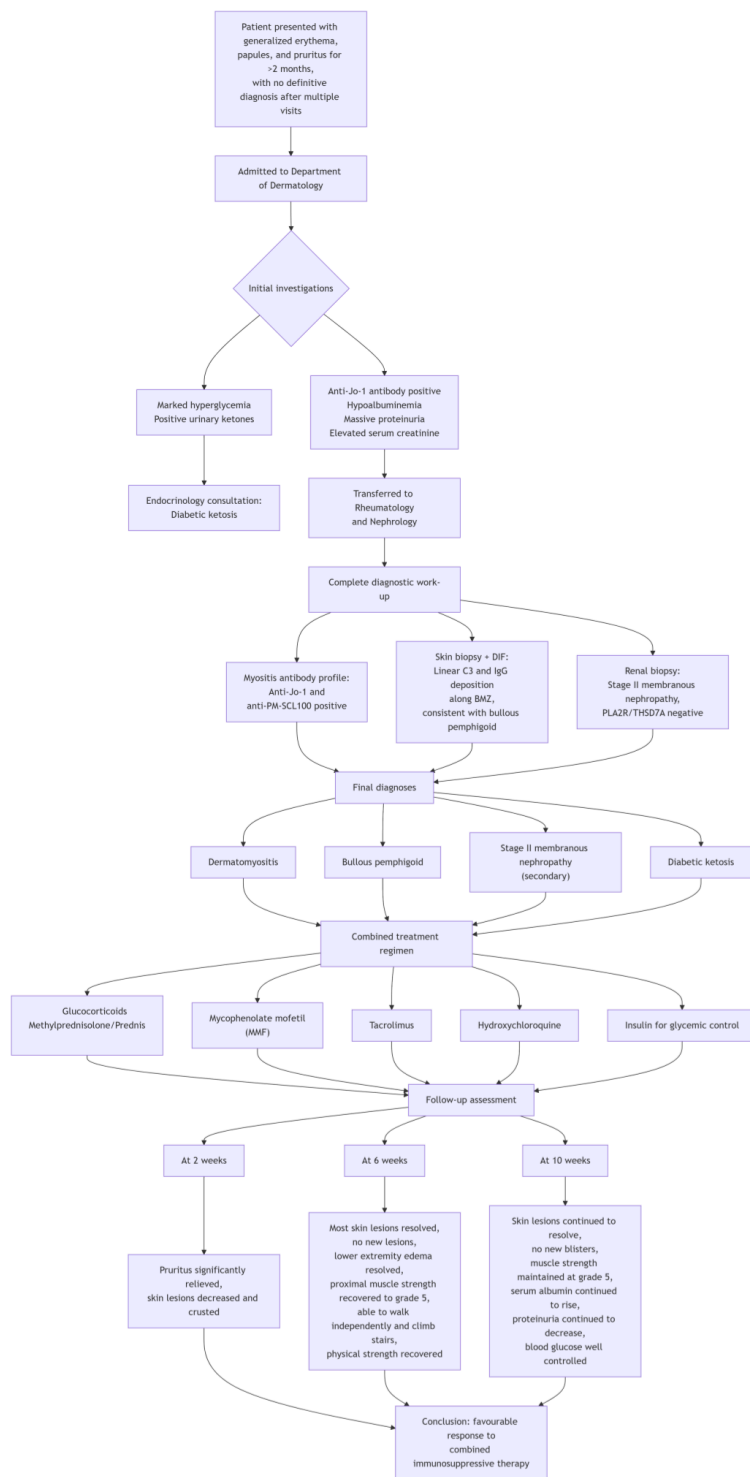


Figure 6

Diagnostic and therapeutic flowchart of the present case.

Supplementary Files

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