Electronic Journal of General Medicine
2023, 20(2), em459
e-ISSN: 2516-3507
https://www.ejgm.co.uk/

MODESTUM

Case Report **OPEN ACCESS**

A young female with hypocomplementemic urticarial vasculitis associated with a rare CNS manifestation

Safi Alqatari [1], Manal Hasan [1], Raed Bukhari [1], Kawther Hadhiah [2], Abrar Alwaheed [3], Fatimah Alabdrabalnabi [4*], Fatimah Al Ohaid [5], Abdullah W Aldarwish [6]

[1] Internal Medicine and Rheumatology, King Fahad University Hospital, Imam Abdulrahman Bin Faisal University, Dammam, SAUDI ARABIA
[2] Neurology, King Fahad University Hospital, Imam Abdulrahman Bin Faisal University, Dammam, SAUDI ARABIA
[3] Internal Medicine and Hematology, King Fahad University Hospital, Imam Abdulrahman Bin Faisal University, Dammam, SAUDI ARABIA
[4] Internal Medicine, Qatif Central Hospital, Al Qatif, SAUDI ARABIA
[5] General Medicine, Saud Al Babtain Cardiac Hospital, Dammam, SAUDI ARABIA
[6] King Saud bin Abdulaziz University for Health Sciences, Riyadh, SAUDI ARABIA
***Corresponding Author:** fatimahibrahim.1.2.3.fi@gmail.com

Citation: Alqatari S, Hasan M, Bukhari R, Hadhiah K, Alwaheed A, Alabdrabalnabi F, Al Ohaid F, Aldarwish AW. A young female with hypocomplementemic urticarial vasculitis associated with a rare CNS manifestation. Electron J Gen Med. 2023;20(2):em459. https://doi.org/10.29333/ejgm/12859

ARTICLE INFO

Received: 02 Aug. 2022

Accepted: 20 Sep. 2022

ABSTRACT

This case report represents a rare case of 14-year-old female who diagnosed with hypocompementemic urticarial vasculitis syndrome that presents with glomerulonephritis, diffuse alveolar hemorrhage, and acute disseminated encephalomyelitis. The progression of the symptoms explained in the text below in which the final diagnosis was reached after a challenging approach. Patient was managed properly and followed up after treating with rituximab, although she represents no sign of the disease after a total of two cycles.

Keywords: hypocomplementemic, urticarial, vasculitis, disseminated, encephalomyelitis

INTRODUCTION

Background

Vasculitis is a complex heterogeneous group of diseases associated with inflammation of blood vessels. They share similar clinical, laboratory, and pathological features. Vasculitis affects multiple body organs and clinical manifestations depend on the type of blood vessels and organs that get involved. It is either primary or secondary to underlying systemic disease, trauma, drugs, or infection [1]. Chapel Hill Consensus Conference (CHCC) in 2012 classified vasculitis according to the blood vessel size to large vessels, medium vessels, and small vessels vasculitis. large vessel vasculitis such as giant cell arteritis and Takayasu arteritis, medium vessel vasculitis like polyarteritis nodosa, and small-vessel vasculitis that is subclassified into ANCA associated vasculitis like granulomatosis with polyangiitis and non-ANCA divided to HSP and leukocytoclastic vasculitis [2]. Hypocomplementemic urticarial vasculitis (HUVS) is a rare type of small vessel non-ANCA associated vasculitis characterized by systemic manifestations, low amount of blood complements, urticaria like exanthema, and positive anti C1q antibodies, which first described by McDuffie and his colleagues in 1973. It was then prescribed the high C1q antibodies presentation in HUVS and proposed the diagnostic criteria in 1982 [3]. Diagnosis of HUVS required two major criteria and at least two minor criteria, hypocomplementemia, and urticaria like exanthema are the major criteria. Minor criteria include arthralgia or arthritis, abdominal pain, ocular inflammation, leukocytoclastic vasculitis, glomerulonephritis, and anti-C1q antibody positivity [4]. It can be caused by a wide range of etiologies including drugs, infections, and connective tissue diseases. However, the majority of cases are idiopathic [4, 5]. Not all the cases present with positive C1q antibodies. C1q antibodies were detected only in 50% of the cases, Low C1q represents higher sensitivity [6]. HUVS can affect any age group with more propensity to affect children and adolescents. The clinical presentation is hugely variable, it can range from simple urticarial lesions and angioedema to life-threatening multi-systemic disease [7]. It involves multiple body systems mostly musculoskeletal and ocular, but it can also present with serious gastrointestinal, pulmonary, and renal injury in some cases. For that reason, any case with dyspnea and protein uremia should be probably investigated [8]. The best management option for HUVS has not to be identified yet. A variety of medications are used in different literature, monoclonal antibodies like rituximab use increased recently as it shows great effectiveness in management, corticosteroid, and immunosuppressive medications are also used [4, 9]. Since vasculitis could occur secondary to systemic disease, the systemic lupus erythematosus (SLE) will rise in our minds. SLE is an autoimmune inflammatory disease that can involve any body organ, lupus nephritis is one of the SLE complications that cause glomerulonephritis. SLE is associated with different types of antibodies including antinuclear antibodies (ANA), anti-double stranded DNA (anti-dsDNA), atiplasma membrane antibodies, and anti-smith antibodies. ANA is diagnostic for

SLE and found positive in 95% of the cases [10, 11]. It was reported that only 50% of SLE cases to be positive for anti-dsDNA antibodies [12]. Few patients present with negative SLE serology [10, 11]. Acute disseminated encephalomyelitis (ADEM) is an autoimmune disease characterized by demyelination in the brain, spinal cord, and occasionally the optic nerve. It is acute and rapidly progressive, involves inflammation of the central nervous system (CNS) as a response to infection, and in some cases due to immunization. Organisms that are most commonly associated with ADEM are cytomegalovirus, Epstein-Barr virus, herpes simplex virus, human herpes-virus-6, influenza virus, hepatitis A, human immunodeficiency virus, and mycoplasma pneumonia, before vaccinations it was also reported with measles, rubella, mumps, varicella, and smallpox. Most of the cases occur in children age less than 10 and the rest between 10 and 20 [13]. Here, we report a rare case of HUVS that presents with glomerulonephritis with a membranoproliferative renal injury, diffuse alveolar hemorrhage, and acute disseminated encephalomyelitis. Since up to our knowledge, there is no literature found to describe HUVS complicated with ADEM.

Contribution to the Literature

Hypocompementemic urticarial vasculitis syndrome was related to many other neurological manifestations in the literature. However, up to our knowledge, this is the only reported case, describing hypocompementemic urticarial vasculitis syndrome complicated with acute disseminated encephalomyelitis.

CASE PRESENTATION

A 14-year-old Saudi female known case of G6PD deficiency presented to the emergency department of King Fahad University Hospital complained of dyspnea at rest and increasing cough for two weeks duration in addition to fever (39.1 C) for five days. Three months prior to her presentation, she noticed anasarca (puffy face, periorbital edema, and bilateral lower limb pitting edema) since she was diagnosed in a military hospital with nephrotic syndrome one day before. She was given prednisolone, despite increasing the dose of steroids her proteinuria did not improve. At presentation, she was on prednisolone 120 mg PO OD. The mother mentioned that the patient has arthralgia in her hands, wrists, and ankles with no swelling. She also reported easy fatiguability and a decrease in appetite in addition to the intermittent confusional state that started with the dyspnea and cough. The mother denied any history of mouth ulcers, skin rash, photosensitivity, gastrointestinal symptoms, bruising or easy bleeding, swelling in any lymph nodes area, sicca symptoms, eye symptoms, and any history suggesting Raynaud's. No recent travel. No antecedent infection. Negative sexual history. Not a smoker or alcohol consumer with no history of drug abuse. Menstrual history is unremarkable as well as her family history, she has a history of IVIg allergy. At presentation, her Glasgow coma scale (GCS) 10+T, blood pressure (BP) 117/70, heart rate (HR) 80, temperature (T) 37.8, she was on mechanical ventilation as air contentious mode, tidal volume (TV 400), respiratory rate (RR) 14, positive end-expiratory pressure (PEEP) 8, fraction of inspired oxygen (FiO2) 50%. On examination, the buccal mucosa is clear but there were levido reticularis on her chest, upper and lower extremities, chest examination showed a diffuse decrease in breath sounds bilaterally mainly in the middle and lower zones. Heart and abdominal examination were within normal, lower limb examination showed bilateral pitting edema up to the knees, there was no digital ulcers or gangrene. The patient considers as a case of pneumonia, according to that she was treated with antibiotics (azithromycin, ceftriaxone, and piperacillin sodium and tazobactam) in addition to tamiflu. She also took a diuretic for the build-up fluid. Labs at presentation are shown in (**Table 1**).

Table 1. Laboratory investigation

Lab	Result	Lab	Result
WBC	12 (4-11)	T. bili	0.2 (0.2-1.2)
Hgb	5.8 (12-16)	SGOT	23 (5-34)
Platlet	408 (140-450)	SGPT	28 (5-55)
Reticulocytes	6.3 (0.2-2)	Albumin	1 (3.2-5.2)
ESR	20 (0-20)	Protein	3 (6.4-8.3)
CRP	5.7 (0.1-0.5)	LDH	269 (125-220)
PT	15.8 (12.9-15.9)	GGTP	15 (9-36)
aPTT	34.3 (25.6-42.3)	ALP	55 (40-150)
BUN	14 (8.4-21)	HBVsAg	Negative
Createnine	0.84 (0.6-1.3)	HBVsAb	Reactive-78.54
K	2.7 (3.5-5.1)	HBVcAb	Negative
Na	144 (136-145)	HCV AB	Negative
Cl	109 (98-107)	HIV	Negative
Mg	1.2 (1.35-2.05)	EBV	Negative
CPK	248 (26-308)	CMV	Negative
Trop I	<0.017 (<0.05)	H1N1	Negative
24 h urine prot	18,703 (50-80) Urine vol. 2.7 L	flu A+B	Negative
Urine culture	Negative	Coxakie	Negative
Blood culture	Negative	Haptoglobin	196 (30-200)
ASO	Negative	SSB	Negative
Parvo	Negative	RNP	Negative
Cryo	Negative	ANCA	Negative
ACE	Normal	PR3	Negative
C3	53 (82-193)	MPO	Negative
C4	9 (13-57)	IgG	300 (716-1,711)
ANA	1:80 (Hom.)	IgA	94 (47-249)
DsDNA	Negative	IgM	35 (15-188)
Smith	Negative	CSF	IgG 462 (10-30) Protein 543 (15-45) Glucose 88 (40-70) Culture negative
SSA	Negative		

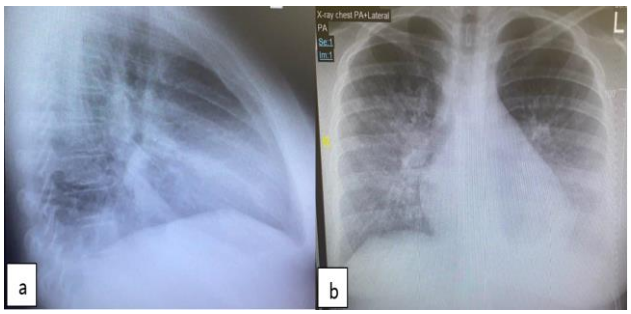

Figure 1. PA (a) and lateral (b) chest X-ray showing bilateral airspace shadowing demonstrated at left lower zone (Source: Authors, reprinted with permission of the patient)

Chest X-ray showed bilateral airspace shadowing demonstrated at left lower zone (**Figure 1**).

Chest CT was used to rule out pulmonary embolism and it was excluded, bilateral pleural effusion and mild pericardial effusion, with subsequent passive atelectasis and consolidation (**Figure 2**), ECHO was done, and it was normal.

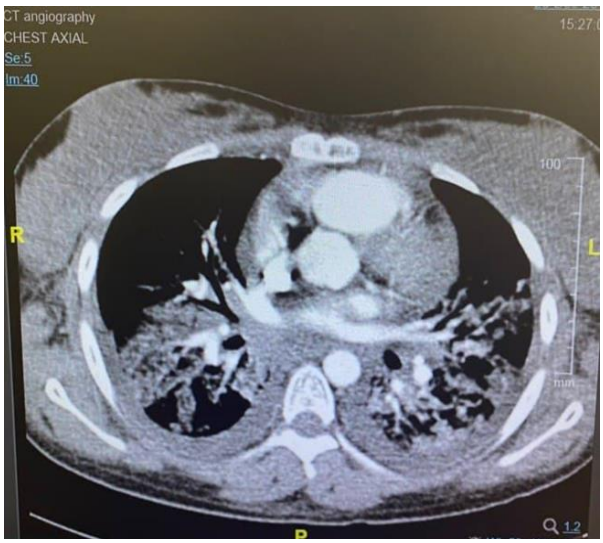

Figure 2. Chest computed tomography, bilateral pleural effusion with subsequent passive atelectasis, and adjacent parenchymal consolidation. Pericardial effusion is also noted. No pneumothorax. The vascular mediastinal structures are unremarkable (Source: Authors, reprinted with permission of the patient)

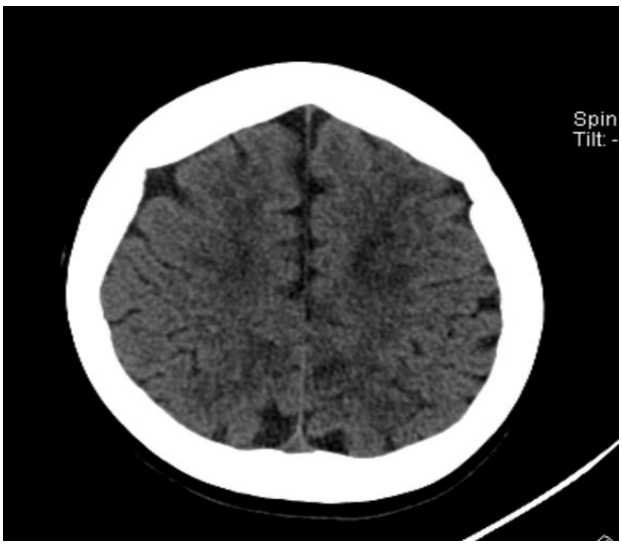

Figure 4. Brain CT without contrast showing bilateral subcortical and cortical frontal, occipital parietal, & bilateral temporal lobe hypodensity. Rest of brain showing preserved gray/white mater differentiation No sizable intra- or extra-axial hemorrhage. No hydrocephalus, midline shifts, & herniation (Source: Authors, reprinted with permission of the patient)

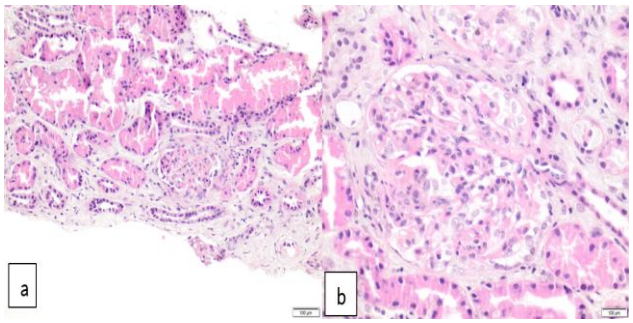

Figure 3. Images show glomeruli with focal mild mesangial proliferation and increased mesangial matrix. One of them showing periglomerular fibrosis. The interstitial tissue shows increase fibrosis with tubular degenerative changes and mild mononuclear cell infiltration (a: H×&E X400 & b: H×&E X400) (Source: Authors, reprinted with permission of the patient)

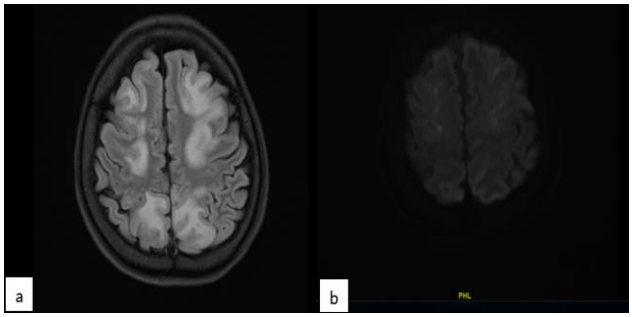

Figure 5. Brain MIR showing multiple scattered abnormal areas of T2 and FLAIR high signal intensity involving both cerebral hemispheres, along both frontal, temporal, parietal and occipital lobes. These abnormalities mainly involving the subcortex regions (Source: Authors, reprinted with permission of the patient)

She was started on ceftriaxone, azithromycin, pulse steroid for three days them prednisolone 1 mg/kg, and plasma exchange (PLEX). The patient starts to develop hemoptysis, her chest examination revealed bilateral coarse crepitation, so a bronchoscope was done with negative culture. diffuse alveolar hemorrhage was diagnosed. direct and indirect Coombs test was negative.

Also, renal ultrasound-guided biopsy considered, the microscopic examination shows three cores of renal parenchymal tissue with five glomeruli showing focal mild mesangial proliferation and increased mesangial matrix. One of them is showing periglomerular fibrosis. The interstitial tissue shows increase fibrosis with tubular degenerative changes and mild mononuclear cell infiltration (**Figure 3**).

Later, the patient developed a headache, she experienced status epilepticus when she sent to do a CT scan for her head, she managed with lorazepam and phenytoin and she was intubated, another CT scan planned to do after she improved the result of the CT described bilateral subcortical frontal, occipital, parietal and bilateral temporal lobe hypodensities/edema with minimal mass effects upon adjacent sulci, these high suggesting Watershed infarctions (**Figure 4**).

Also, MRI done, showed picture suggestive of acute disseminated encephalomyelitis, diffuse soft tissue edema in the form of T2 high signal intensity involving the back extent from cervical aspect down to the coccyx, lumbar puncture showed bloody tap, demyelination disease such as ADEM highly suggestive (**Figure 5**).

As shown in Figure 5, the abnormalities mainly involving the subcortex regions, however, some of which are appears to be involved the cortex. These lesions are somehow almost symmetrical in distributions. It demonstrates increase diffusivity in ADC map.

There are multiple foci of increased DWI within both parietal lobes, could be diffusion restriction. No abnormal blooming artifact to suggest hemorrhage. The corpus callosum is intact with no abnormal signal intensity. The basal ganglia, thalamus and brainstem are within normal. The posterior fossa structures are within normal. No abnormal cerebellar tonsillar

descent. No hydrocephalus. No midline shifts. There is mucosal thickening involving the imaged paranasal sinuses. Fluid signal intensity within the mastoid air cells bilaterally. Orbits are intact.

This patient had low C3 and C4 with positive ANA. Also, R-CRP was high. This patient considers having seronegative systemic lupus erythematous with CNS, lungs, and kidneys involvement. She discussed to be treated by cyclophosphamide, her family refused due to the risk of infertility), while covered with antibiotics and antifungal started her on cellcept and rituximab, she followed up in the clinic for the last one and a half year, she is doing very well, back to school and her usual activities and is excelling, her 24h urine protein fluctuates between 100 and 850 depending on her compliance to the Cellcept. She received a total of two cycles of rituximab and is refusing to receive more.

DISCUSSION

In this case, the patient's first presentation showed signs and symptoms of kidney damage, she presented with periorbital edema and bilateral pitting edema. Her laboratory shows the presence of proteinuria and hematuria. Renal biopsy is done showing glomerular focal mesangial proliferation, mesangial fibrosis, periglomerular fibrosis, and tubular degenerative change. A similar finding was represented by Kenji et al, when he reports a case with HUVS with gastrointestinal vasculitis and crescentic membranoproliferative glomerulonephritis (MPGN), which was not associated with immune complex deposits alike our case which shows a high title of anti C1q antibody [4]. It was reported three cases of HUVS that presented with rabidly progressive glomerulonephritis with severe nephrotic syndrome. They provide a systemic review of 60 case reports of patients with HUVS and kidney damage from 1976 to 2020. 18% of the cases were under the age of 18, they found that HUVS affects women more than men with a ratio of 8:1. 70% of the patients had proteinuria and hematuria and one-third had abnormal renal function test upon presentation. 52 of these patients underwent renal biopsy. Among which 35% of them had a membranoproliferative glomerular injury, 21% had mesengioproliferative and 19% had a membranous glomerular injury, only one case reported has urticarial lesion appears after the kidney manifestation [3]. Another study reported a HUVS case with features of renal injury, diagnosed with refractory chronic urticaria treated with Omalizumab for three years with poor response, her complaints were chronic uveitis, arthralgias, urticarial rash, glomerular hematuria, and pulmonary manifestations as a chronic obstructive pulmonary disease (COPD).

Renal biopsy reveals immune complex membranoproliferative glomerulonephritis, then she managed with rituximab [5]. Studies show many cases presented with renal damage, it occurs in 14%-50% of the cases [4], whereas in addition to the renal manifestation, our reported case was also suffering from pulmonary manifestations when she developed hemoptysis and diagnosed with diffused alveolar hemorrhage (DAH) with negative culture. A retrospective study done involving 23 cases of HSP complicated by DAH [14]. It was reported similar findings regarding the relation between DAH and renal damage, where most DAH patients also had a renal injury [14]. Another study showed a case of Henoch-Schonlein purpura (HSP) with DAH [15]. HSP is a type of small vessel vasculitis that most commonly affects young children. Pulmonary involvement is rare in HSP.

A systemic review of 23 cases of HSP with pulmonary involvement between 1979 and 2019 were conducted and it was found that DAH was the most frequent pulmonary manifestation of the HSP. The gold stander diagnosis of DAH is bronchoalveolar lavage, but it can also be diagnosed with a chest X-ray. DAH is managed with pulse methylprednisolone, unless it progresses to respiratory failure, it managed with immunosuppressive including azathioprine, cyclophamide, and corticosteroid [15]. We could not find any reported cases of patients with HUVS presented DAH. Furthermore, a case-control study reported that lupus nephritis (LN) is a risk factor for ADH in addition to thrombocytopenia, and elevated CRP [16]. DAH is one of the severe SLE complications associated with high mortality, it is also found to be associated with systemic vasculitis such as microscopic polyangiitis and granulomatosis with polyangiitis. Dr. William Osler was the first one to describe DAH. DAH can be diagnosed in SLE patients in the presence of several features include drop-in hemoglobin level, hemoptysis, dyspnea, thrombocytopenia, C3 hypocomplementemia and diffuse infiltrate chest X-ray. The etiology of DAH is not clearly understood but 80% of SLE cases show an increased risk of ADH in association with active kidney disease and lupus nephritis [12, 16, 17].

Another study discussed the incidence of DAH in SLE patients which range from 0.6% to 5.4% [17]. Also, our patient had ADH as the first presentation of SLE. This is corresponding with a cohort study published by Quintana et al, who found 30% of SLE patients have ADH as a first manifestation. It was reported an increased risk of mortalities with lower albumin levels [12]. Moreover, Infection can be a cause of ADH and should be rolled out before making a diagnosis, also some studies reported a relationship between the use of immunosuppressive and ADH [12, 17].

It was observed four SLE cases that develop ADH after pulse of steroid therapy, but it was not clear if these patients had subclinical ADH, or it was due to preexisting severity of the disease or due to the initiation of steroid therapy [17]. 50% of SLE patients have an affected central nervous system (CNS), they can present with headache and seizure which also were seen in this case. Other symptoms include visual alteration, myelitis, stroke, movement disorder, memory impairment, personality changes, and depression. It was presented a similar case of a patient with SLE who had ADEM. This patient starts to have lower limb weakness after two weeks of presentation of pleuritic chest pain a joint inflammation. Like our patient presentation of ADEM processed the diagnosis of SLE [18]. It was reported a case of SLE that first presentation symptoms were indicated ADEM [19]. There were only a few pieces of literature that report cases of ADEM in SLE patients and we could not find any case report of a patient having ADEM as a complication of HUVS, this was the uniqueness of this reported study who having ADEM as a complication of vasculitis.

CONCLUSION

HSUV is a rare multisystemic disease that can be mild to fatal. Although the majority of cases occurs in the fifth decade, it should be suspected in younger patients who present with

vasculitis, low complements, and negative antibodies. As the data is scarce, we need further studies to develop updated criteria to aid clinicians in diagnosing such a complex disease and help them formulate a management algorithm.

Author contributions: SA: design of the work; **MH & RB:** interpretation of data; **KH:** conception; **AA:** acquisition and analysis; & **FA, FAO, & AWA:** drafted the work. All authors have agreed with the results and conclusions.

Funding: No funding source is reported for this study.

Ethical statement: Ethics committee approval was not applicable, since the study is a reported case that occurred in healthcare sitting without any additional intervention by the authors towards any humans, animals, or environment. Patient information was kept confidential and information that could potentially identify the patient was not disclosed.

Declaration of interest: No conflict of interest is declared by authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

REFERENCES

1. Jatwani S, Goyal A. Vasculitis. StatPearls. 2022. https://www.ncbi.nlm.nih.gov/books/NBK545186/ (Accessed 1 August 2022).
2. Hoang MP, Park J. Vasculitis. In: Hoang MP, Selim MA, editors. Hospital-based dermatopathology: An illustrated diagnostic guide. Springer International Publishing; 2020. https://doi.org/10.1007/978-3-030-35820-4_7 PMCid: PMC7120156
3. Ion O, Obrișcă B, Ismail G, et al. Kidney involvement in hypocomplementemic urticarial vasculitis syndrome-A case-based review. J Clin Med. 2020;9(7):2131. https://doi.org/10.3390/jcm9072131 PMid:32640739 PMCid:PMC7408727
4. Ueki K, Tsuchimoto A, Matsukuma Y, et al. Hypocomplementemic urticarial vasculitis syndrome with gastrointestinal vasculitis and crescentic membranoproliferative glomerulonephritis without immune complex deposits. CEN Case Rep. 2020;9(1):30-5. https://doi.org/10.1007/s13730-019-00421-4 PMid: 31586313 PMCid:PMC6990357
5. Vallianou K, Skalioti C, Liapis G, Boletis JN, Marinaki S. A case report of hypocomplementemicurticarial vasculitis presenting with membranoproliferative glomerulonephritis. BMC Nephrol. 2020;21(1):351. https://doi.org/10.1186/s12882-020-02001-6 PMid: 32811472 PMCid:PMC7433181
6. Jachiet M, Flageul B, Bouaziz JD, Bagot M, Terrier B, Groupe Français d'Étude des Vascularites (GFEV). Les vascularites urticariennes hypocomplémentémiques [Hypocomplementemic urticarial vasculitis]. Rev Med Interne. 2018;39(2):90-8. https://doi.org/10.1016/j.revmed.2017.03.005 PMid:28457680
7. Buck A, Christensen J, McCarty M. Hypocomplementemic urticarial vasculitis syndrome: A case report and literature review. J Clin Aesthet Dermatol. 2012;5(1):36-46.
8. Sjöwall C, Skattum L, Olsson M, Nilsson A, Mohammad AJ. [Hypocomplementemic urticarial vasculitis syndrome: A rare but not always benign condition]. Lakartidningen. 2019;116:FR49.
9. Baigrie D, Bansal P, Goyal A, Crane JS. Leukocytoclastic Vasculitis. StatPearls. 2022. https://www.ncbi.nlm.nih.gov/books/NBK482159/ (Accessed 1 August 2022).
10. Simmons SC, Smith ML, Chang-Miller A, KeddisMT. Antinuclear antibody-negative lupus nephritis with full house nephropathy: A case report and review of the literature. Am J Nephrol. 2015;42(6):451-9. https://doi.org/10.1159/000443747 PMid:26812129
11. Dagel T, Meram E, Onal E, Erbil D, Bulbul M, Uysal S. Rare case: 70 year old patient with seronegative lupus nephritis. Medeni Medical J. 2018;33(1):54-6. https://doi.org/10.5222/MMJ.2018.34467
12. Quintana JH, Aragón CC, Santos VA, et al. Diffuse alveolar hemorrhage: A cohort of patients with systemic lupus erythematosus. J Clin Rheumatol. 2020;26(7S Suppl 2):S153-7. https://doi.org/10.1097/RHU.0000000000001228 PMid:31895107
13. Anilkumar AC, Foris LA, Tadi P. Acute disseminated encephalomyelitis. StatPearls. 2020. https://www.ncbi.nlm.nih.gov/books/NBK430934/ (Accessed 1 August 2022).
14. Mirouse A, Parrot A, Audigier V, et al. Severe diffuse alveolar hemorrhage related to autoimmune disease: A multicenter study. Crit Care. 2020;24:231. https://doi.org/10.1186/s13054-020-02936-0 PMid:32423434 PMCid:PMC7236262
15. Di Pietro GM, Castellazzi ML, Mastrangelo A, Montini G, Marchisio P, Tagliabue C. Henoch-Schönlein Purpura in children: Not only kidney but also lung. Pediatr Rheumatol Online J. 2019;17(1):75. https://doi.org/10.1186/s12969-019-0381-y PMid:31752918 PMCid:PMC6873759
16. Sun Y, Zhou C, Zhao J, et al. Systemic lupus erythematosus-associated diffuse alveolar hemorrhage: A single-center, matched case-control study in China. Lupus. 2020;29(7):795-803. https://doi.org/10.1177/0961203320920715 PMid:32321345
17. Al-Adhoubi NK, Bystrom J. Systemic lupus erythematosus and diffuse alveolar hemorrhage, etiology, and novel treatment strategies. Lupus. 2020;29(4):355-363. https://doi.org/10.1177/0961203320903798 PMid: 32036761 PMCid:PMC7436451
18. Gil Alzueta MC, Erro Aguirre ME, Herrera Isasi MC, Cabada Giadás MT. Acute disseminated encephalomyelitis as a complication of systemic lupus erythematosus. Neurologia. 2016;31(3):209-11. https://doi.org/10.1016/j.nrl.2014.02.001 PMid:24703160
19. Bermejo PE, Ruiz A, BeisteguiM, Zabala JA, Escamilla C. Hemorrhagic acute disseminated encephalomyelitis as first manifestation of systemic lupus erythematosus. J Neurol. 2008;255(8):1256-8. https://doi.org/10.1007/s00415-008-0848-0 PMid:18425695