Critical Rounds
Vol 4 | Issue 40 | 2023

Critical Rounds Newsletter
VOL 4 | Issue 40 | 2023

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you **"Critical Rounds Newsletter"** which contain latest and interesting news in the field of Critical Care .

This issue contains :

1. The NEWS-Lactate and NEWS' Predictive Performance Towards Mortality or the Need for Critical Care Among Patients with Sepsis Suspicion in the Emergency Department.

2. Grading, timing, and association between outcome of treatments for intracranial hypertension in acute brain injury patients

3. Frailty is a more significant predictor of death in younger critical care patients than in older patients.

4. Rosai-Dorfman-Destombes disease after COVID-19 infection: a rare case

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Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited

Critical Rounds
Vol 4 | Issue 40 | 2023

1. The NEWS-Lactate and NEWS' Predictive Performance Towards Mortality or the Need for Critical Care Among Patients with Sepsis Suspicion in the Emergency Department

Introduction:

According to the Third International Consensus Definition for Sepsis and Septic Shock, sepsis is an organ dysfunction with a sequential organ failure assessment (SOFA) score of 2 that is "life-threatening organ dysfunction generated by a dysregulated host response to infection" (Sepsis-3).[1] Sepsis is a serious worldwide health issue with high rates of morbidity, death, and treatment expenses. The frequency of sepsis varies from 13.6 to 39.3% in various geographical locations, while ICU mortality ranges from 25.8 to 35.3%, according to a recent epidemiologic assessment by the Intensive Care Over Nations (ICON). Even in the most advanced ICUs, it is the major cause of morbidity and mortality.[2] The National Early Warning Score (NEWS) was developed to predict the likelihood that ward patients will suffer a cardiac arrest, require admission to an intensive care unit (ICU), and mortality. The primary objective of this research was to assess the National Early Warning Score-Lactate (NEWS-L) and NEWS to predict 24-hour mortality. [1]The objectives were to predict the fatality rates at 48, 28, and hospital days as well as the need for critical care in patients with suspected sepsis in the emergency department (ED).

In the emergency department, NEWS-Lactate is a reliable predictor of 24-hour mortality in septic patients.

Variables	24-Hour Non-Survivors	24-Hour Survivors	p-value
NEWS	12 (10.5, 12.5)	8 (6, 9)	0.024
NEWS-L	18.7 (15.2, 19.1)	10.6 (8.9, 13)	0.036
Initial Lactate; mmol/L	5.7 (4.2, 6.7)	2.9 (1.9, 4)	0.118
Lactate at 2 hours; mmol/L	2.4 (1.7, 4)	1.9 (1.1, 3.3)	0.598
Lactate clearance; %	25 (18.1, 53.7)	31.6 (6.7, 45.5)	0.742
SOFA score before admission	2.5 (2.2, 2.8)	2 (2, 4)	NA*

Comparison of NEWS, NEWS-L, SOFA Score, Lactate Levels and Lactate Clearance with 24-Hr Mortality of Sepsis Patients in the Emergency Department

Methods:

The tertiary referral and academic 855-bed hospital where its study was done has an ED volume of approximately 48,000 patient visits annually. From March to November 2021, sepsis patients under the age of 18 were the subject of this study. The predictive values of NEWS and NEWSL for 24-hour mortality were established using area under the receiver operating characteristic curve (AUROC) studies.

Results:

A total of Ninety-two patients (mean age 68 years, 48 [52.2%] males) were recruited. 34 (36.7%) patients required critical care while they were in the ED, and 3 (3.2%) patients

suffered within 24 hours. In comparison to 24-hour survivors, the median (interquartile range) NEWS and NEWS-L outcomes were higher in the non-survivors: 12 (10.5, 12.5) compared 8 (6, 9), p = 0.024; and 18.7 (15.2, 19.1) versus 10.6 (8.9, 13), p = 0.036. The primary outcome's adjusted odds ratio (aOR) was 1.22 when the NEWS-L raised by 1 unit without statistically significant difference (p = 0.228). The statistically significant aOR values for the secondary outcomes varied from 1.34 to 1.67. 24-hour mortality was predicted by a NEWS-L of 11 and a NEWS of 12, respectively, with sensitivities/specificities of 100%/56% and 67%/91%.

Discussion:

Any method for predicting the progression of sepsis that solely uses a single physiological parameter measurement that may be unreliable since sepsis is a dynamic condition. The management of emergency patients can be enhanced by screening them using both physiological data and quick blood tests. [3] Additionally, it is seldom easy to evaluate patients in an ED. Adequate treatment advice and the use of efficient diagnostic instruments are required.[2] In patients on the ward and in the emergency department, NEWS is a reliable tool for predicting unexpected ICU admission, cardiac arrest, and mortality within 24 hours. In predicting mortality in ED septic patients, a research by Brink et al. found NEWS to be better to other grading systems.[4]

Conclusion:

In the ED, NEWSL performed better than NEWS for each outcome and is a true indicator of 24-hour death among septic patients. In general, NEWS-L showed good to exceptional ability to predict sepsis-related negative outcomes.

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2. Grading, timing, and association between outcome of treatments for intracranial hypertension in acute brain injury patients

Introduction:

Critical Rounds
Vol 4 | Issue 40 | 2023

Cerebrospinal fluid (CSF) pressure inside the skull is raised in a variety of neurological conditions known as intracranial hypertension. Age affects normal CSF pressure. CSF pressure above 200 mm H2O in children and 250 mm H2O in adults often indicates increased intracranial pressure (ICP). It could develop due to a neurologic insult or injury, or it might be idiopathic.[1] There are still questions regarding the efficacy and safety of treatments for individuals with acute brain injuries (ABI) who have intracranial hypertension. The management of patients with acute brain injuries (ABI) in the intensive care unit (ICU) includes controlling harmful rises in intracranial pressure (ICP).[2] The aim of this research is to describe the treatment procedures utilised in ABI, with or without intracranial pressure (ICP) monitoring, among various pathologies and in various nations, and their correlation with six-month mortality and neurological outcomes.

Therapies to control elevated intracranial pressure, particularly mild-moderate therapeutic intensity level, are routinely administered during the first week of ICU hospitalisation. Adopting aggressive approach can improve six-month mortality in a subset of patients, but not neurological outcome.

Methods:

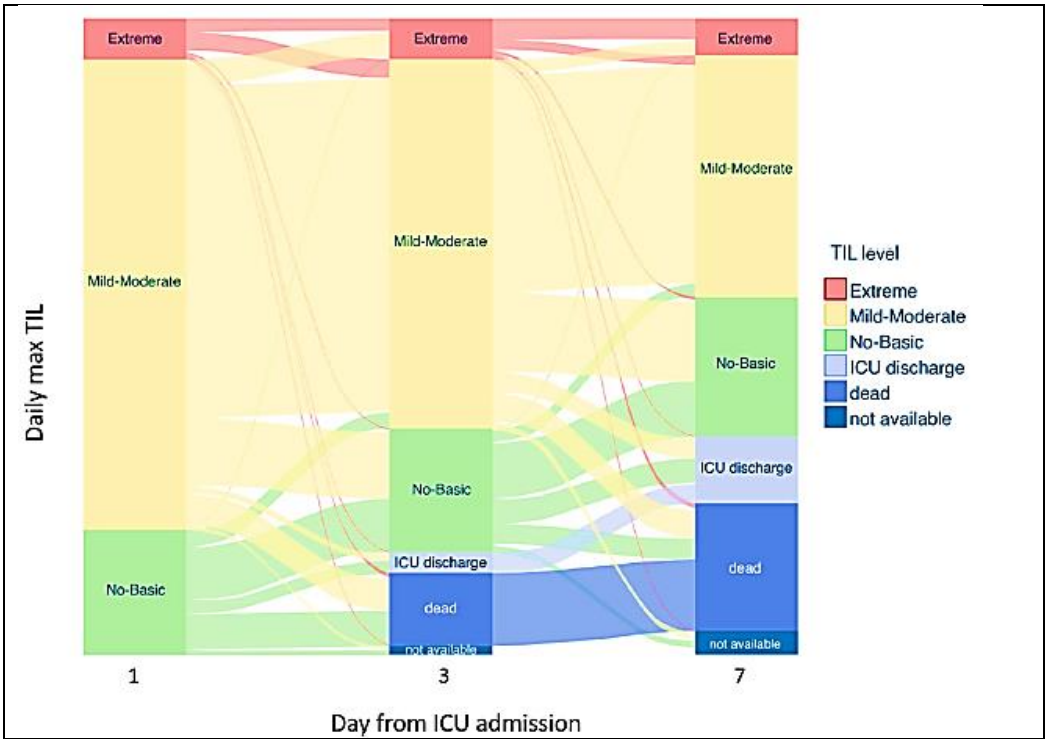
A planned subanalysis of the SYNAPSE-ICU study, a prospective, multicenter, multinational, observational cohort study, documenting the ICP therapy rated using the Therapy Intensity Level (TIL) scale in patients with ABI during the first week of intensive care unit (ICU) admission. Data were deidentified and kept in an online database (eCRF). According to the therapeutic intensity level (TIL) scale, interventions to reduce intracranial hypertension were documented. The prevalence of TIL usage in ABI in the first week following ICU admission was the main objective. Mortality and the Glasgow Outcome Scale Extended (GOSE), which were measured at a 6-month follow-up using a validated questionnaire, were secondary outcomes. A GOSE score of less than 5 was seen to be an unfavourable result.

Results:

The analysis covered 2320 patients. With 800 (34.5%) women, the median age was 55 (I-III quartiles=39-69). No-basic TIL was employed in 382 (16.5%) patients within the first week after ICU admission, mild-moderate in 1643 (70.8%), and extreme in 295 cases (eTIL, 12.7%). Patients who received eTIL were younger (median age 49 (I-III quartiles=35-62) vs 56 (40-69) years, p< 0.001), had fewer cardiovascular pre-injury comorbidities (859 (44%) vs 90 (31.4%), p< 0.001), experienced more episodes of neuro-worsening (160 (56.1%) vs 653 (33.3%), p< 0.001), and were monitored. Between centres and nations, there was a noticeable difference in the types of eTIL used and how frequently they were used. Individuals who did not get basic TIL at six months had a greater mortality risk (hazard ratio, HR=1.612, 95% confidence interval, CI=1.243-2.091, p0.001) than patients who did receive eTIL. When comparing mild-moderate TIL with eTIL, no difference was seen (HR=1.017, 95% CI=0.823-1.257, p=0.873). There was no significant link between TIL usage and neurological outcomes.

Discussion:

The most recent consensus statement[3] and the Brain Trauma Foundation Guidelines [4] both recommend using a "staircase" approach, starting with low risk-benefit profiles, such as head elevation and systemic cardiorespiratory function optimization, and escalating progressively to more aggressive and high-risk treatments in the event of refractory intracranial hypertension. This strategy is based on the idea that aggressive therapies "per se" can result in significant complications, therefore it is unclear how they will affect the outcome.[2]



Alluvial plot describing the dynamic of the daily maximum therapy intensity level (TIL) and outcome (dead and ICU discharge) at days 1, 3, 7 since intensive care unit (ICU) admission. Blocks represent patient's group according to the TIL, and stream fields between the blocks represent the patient's transition over time

Conclusion:

Acute brain injury patients are routinely treated for intracranial hypertension during the first week of ICU care. Highly aggressive therapy continues to vary significantly between centres and do not always take the staircase approach advised by the most recent guidelines. Although aggressive strategies can reduce mortality by six months, they cannot improve neurological outcomes by six months.

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3. Frailty is a more significant predictor of death in younger critical care patients than in older patients.

Introduction:

Frailty is typically characterised as a state of diminished physiological reserve and higher susceptibility to failure to restore homeostasis following a stressor. Frailty is closely linked to a variety of poor health outcomes, such as mortality, hospital admission, and disability.[1] In the past ten years, there has been a sharp increase in interest in frailty in patients receiving intensive care unit (ICU) care. While frailty is an established predictor of unfavourable outcomes in elderly patients, its impact on younger adults remains uncertain.[2] This prospective observational study was carried out in a mixed tertiary ICU to evaluate the effect of frailty on long-term survival in critical care patients of various ages.

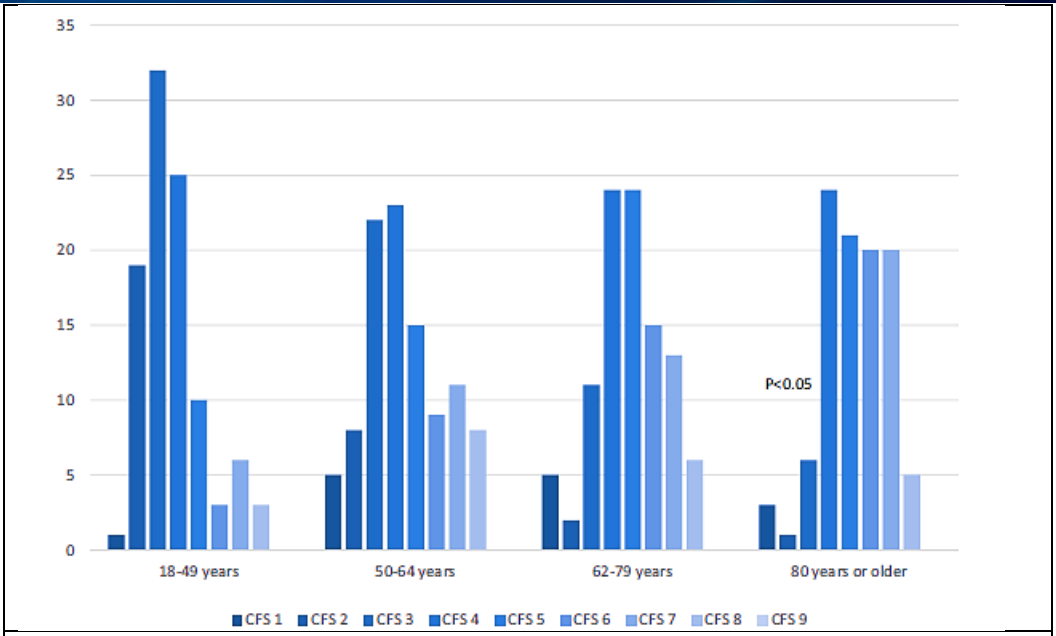
With a twofold increase in the risk of death, frailty was independently linked to mortality in middle-aged patients

Methods:

This was an observational study which involved 817 adult ICU patients. Data was collected on 817 adult ICU patients' premorbid frailty (measured by the Clinical Frailty Score; CFS), disease severity (measured by the Simplifed Acute Physiology Score, third version; SAPS3), care limitations, and prognosis. For deaths that occurred within 180 days of ICU admission, hazard ratios (HR) were determined. Different age groups' associations between frailty and outcome were assessed using unadjusted and adjusted methods.

Results:

Patients were divided into predetermined age categories, including 18–49 years (n=241), 50–64 years (n=188), 65–79 years (n=311), and 80 years or above (n=77). In the total population, there were 41% (n=333) of frail (CFS-5) patients, and this proportion continued to rise with age (n=46 (19%), n=67 (36%), n=174 (56%) and n=46 (60%), P<0.05). Patients who were frail had greater SAPS3, more limitations on their therapy, and increased ICU mortality. In all age categories, frailty was linked to a higher risk of 180-day mortality (HR 5.7 (95% CI 2.8-11.4), P><0.05; 8.0 (4.0-16.2), P<0.05; 4.1 (2.2-6.6), P<0.05; 2.4 (1.1-5.0), P=0.02). Only in individuals aged 50–64 did the effect remain to be significant after adjusting for SAPS3, comorbidities, and treatment restrictions (2.1 (1.1–3.1), P0.05). After adjusting for SAPS3, comorbidity, and treatment limitations, the effect was still significant only in patients aged 50–64 (2.1 (1.1–3.1), P<0.05).



Clinical Frailty Scale (CFS) scores stratified by age groups

Discussion:

This investigation investigated at how frailty affected patients of various ages' ability to survive after receiving intensive care. Thus, this study offers fresh perspectives on the incidence of frailty and how it affects the likelihood of death in younger critically ill patients.[2] A recent, extensive study reported on the implementation of routine frailty screening in intensive care patients of all ages in Australia and New Zealand.[3] The negative prognostic impact of frailty in younger patients was also found in this study. This study contributes to the scant body of knowledge addressing the effects of frailty in intensive care patients of all ages, supporting a wide approach to the use of frailty assessment in intensive care.[2]

Conclusion:

Premorbid frailty affects the majority of individuals under the age of 64 and is common in critically ill patients of all ages. The extent to which frailty is linked to an elevated risk of death is most pronounced in individuals who are middle-aged. Researchers concluded that frailty must be taken into account in all critically ill adult patients, especially those who are middle-aged.

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Critical Rounds
Vol 4 | Issue 40 | 2023

4. Rosai-Dorfman-Destombes disease after COVID-19 infection: a rare case

Introduction:

Sinus histiocytosis with massive lymphadenopathy, also known as Rosai-Dorfman-Destombes disease (RDD), is a rare case of non-Langerhans cells histiocytosis. Since it was initially reported in 1969, it has shown a wide range of variations in presentation. RDD has a variety of clinical manifestations, and its aetiology is not well known.[1] Numerous case reports of patients who developed lymphadenitis after receiving an anti-SARS-CoV-2 messenger RNA vaccine have been reported.[2] Here, researchers describe a rare instance of RDD that was diagnosed through biopsy following the administration of the COVID-19 mRNA vaccine and subsequent COVID-19 infection.

Although the pathophysiology of COVID-19 disease and its connection to a rare histiocytic disease is not fully understood, it may be assumed that the infection-related immune dysregulation is the cause.

Case Presentation:

A 55-year-old woman presented at the hospital with a painless swelling on the left side of the neck and an ongoing generalised rash over the previous month. Her sole previous illness, which occurred when she was 24 years old, was infectious mononucleosis. She had experienced allergic reactions to cefaclor, and she also reported getting a rash. Prior to receiving her COVID-19 vaccine booster shot with Moderna's mRNA vaccination (mRNA-1273) against SARS-CoV-2 on the left arm, the patient was reported to be in good health. There was no prior vaccination history. She had soreness and edoema in her left arm at the injection site for about 4 days following the vaccination. She experienced swelling on the left side of her neck a week later, and a diffuse urticarial rash appeared two weeks later. A month after the rash first appeared in the left mid-back, she had a skin biopsy performed on it, and the results revealed an eosinophilic perivascular cell infiltrate that was consistent with a drug reaction. The results of blood tests conducted on the same day revealed a platelet count of 296,000/mm3, a haemoglobin level of 10.9 g/L, and a white blood cell (WBC) count of 2.5 10^9/L. Red blood cell (RBC) count was 5.04 × 109/L, red cell distribution width (RDW) was 15.8%, absolute lymphocyte count (ALC) was 1.79× 10^9/L, absolute neutrophil count (ANC) was 0.54 × 10^9/L, MCV was 71 femtoliter. Her complete metabolic panel showed no abnormalities. She tested positive for SARS-COV-19 around 15 days after the biopsy and had a fever and a slight cough; however, these symptoms vanished completely within a few days. A repeat blood test performed a month after contracting COVID-19 revealed bi-cytopenia as well, with haemoglobin levels of 9.6 g/L, a WBC count of 1.8 × 10^9/L, an ANC of 1.16, and an ALC of 0.40 10^9/L. Alanine transaminase/aspartate transaminase (ALT/AST) levels in the liver were slightly increased at 49/59 units/L. Studies on iron were within accepted limits. She returned with a painless rash on her face, primarily in the nose, mouth, and chin, expanding to the upper chest region, about three months after contracting COVID-19. She also experienced a rash that spread to her extremities and back, and she noted that her cervical lymphadenopathy had become worse as well as the lymphadenopathies in her neck, axilla, and groin. She also mentioned fatigue and a 4 kg weight reduction over the

previous three months as constitutional symptoms. Vital signs during a physical examination were normal, with the exception of a tachycardia of 102 beats per minute. A head and neck examination revealed a patchy, erythematous plaque-like rash that covered the upper chest and arms in addition to the face, perioral region, chin, and nose. The upper extremities and back reportedly displayed a patchy erythematous plaque-like rash. A lymph node examination revealed palpable lymph nodes in the bilateral axillae with a maximum size of 3 × 2 cm more in the left than in the right, diffuse adenopathy of the bilateral cervical area with a maximum size of 2 × 2 cm, and lymph nodes in the bilateral inguinal area. Lymph nodes had a smooth texture and were only lightly sensitive. The remainder of the assessment went according to plan. A WBC count of 2.3×10^9/L, a haemoglobin level of 9, and an erythrocyte sedimentation rate (ESR) of 46mm were revealed by further testing. The results of the chest x-ray were normal. The cytomegalovirus (CMV) IgM and IgG antibodies were also positive. Total complement CH50 was less than 10 units/ml, complement C3 was reduced to 49, complement C4 was also reduced to 4 mg/dl. An ANA pattern of homogeneous and double-stranded DNA antibodies was negative, and the ANA titer ranged from 1 to 320. QuantiFERON TB's status was unknown. One month later, a neck computed tomography (CT) scan revealed extensive bilateral levels of 1-4 lymphadenopathy, with the largest area being the left base of neck level IV, which measured roughly 3 × 2.7 × 2.0 cm.Bilateral axillary lymphadenopathy was detected by a chest CT scan with contrast. On the right axilla, the biggest one measured 2.6 x 1.2 cm. On the left axilla, the biggest one measured 2.7 x 1.3 cm. There is no hilar or mediastinal lymphadenopathy. She then had a biopsy of her left supraclavicular lymph nodes. A supraclavicular lymph node biopsy revealed a significant polyclonal plasmacytosis and unusual interfollicular B-cell proliferation linked to Rosai-Dorfman illness. Polyclonal B-cells were visible using flow cytometry, and T cells revealed no decrease of Pan-T-cell antigen. Ig gene rearrangement and TCR gamma gene rearrangement using polymerase chain reaction (PCR) revealed clonal and polyclonal pattern, respectively. Methylprednisolone was employed to begin the treatment at a dose of 24 mg per day, which was then gradually reduced over the course of three weeks to 8 mg per day. Clinical improvements were seen in the patient, who experienced improvements in her skin rash and lymphadenopathy. In the following three weeks, she continued a moderate steroid taper while also reporting improvements in fatigue and exercise tolerance. The woman stated that all of her problems had vanished after two months of using steroids.

Discussion:

A rare histiocytic disorder known as Rosai-Dorfman-Destombes disease was named for Juan Rosai and Ronald Dorfman who studied 34 cases in 1969 under the name sinus histiocytosis with extensive lymphadenopathy after Pierre Paul Louis Lucien Destombes initially described it in 1965. It can manifest alone or in conjunction with autoimmune, genetic, and cancerous disorders. [3]The majority of patients exhibit extensive, painless, bilateral cervical lymphadenopathy, which may or may not be accompanied by other systemic symptoms. The mediastinal, axillary, inguinal, and occasionally the retroperitoneal lymph nodes might also be affected. In this case report, the patient experienced fatigue and weight loss in addition to bilateral cervical, axillary, and inguinal

lymphadenopathy. In 10% of instances, the skin may be affected.[2] Skin lesions might vary, but they are typically described as painless, non-pruritic nodules, plaques, or erythematous papules that range in colour from yellow to red to brown. On the face, periorbital region, and around the nose, patient exhibited a patchy erythematous rash.[2]

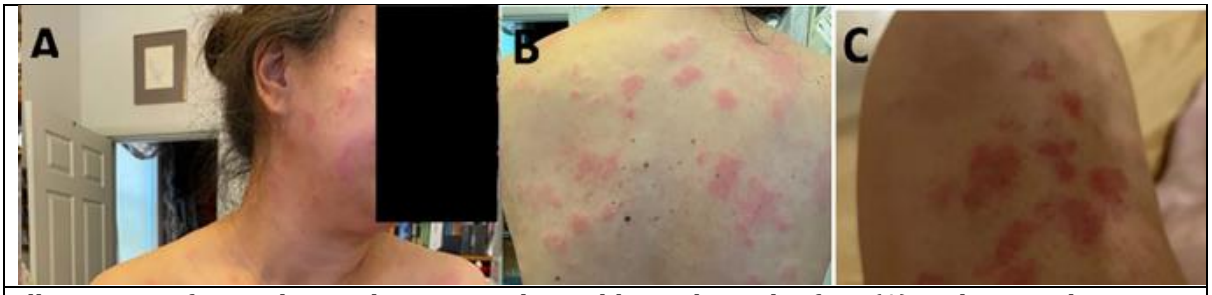

Illustration of a patchy erythematous plaque-like rash on the face (A) and an erythematous plaque-like rash on the body (B,C).

Conclusion:

Though the pathogenesis of COVID-19 disease and its link to a rare histiocytic disease is not fully known, it may be assumed that immunological dysregulation brought on by the infection is the cause. A few case reports have recently emerged that imply a connection between acquiring the SARSCoV-2 virus and the emergence of histiocytic diseases with a range of presenting symptoms. Researchers present a unique case of Rosai-Dorfman-Destombes disease here, which manifested months after getting the mRNA vaccination and later after contracting COVID-19 infection.

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