

SECTION OF PATHOLOGY СЕКЦІЯ ПАТОЛОГІЇ

HISTOPATHOLOGICAL CHARACTERISTICS OF LUNG LESIONS IN COVID-19 ASSOCIATED PNEUMONIA: SYSTEMATIC REVIEW AND META-ANALYSIS

Kapustianskyi I.D.

Research advisor: Assist. Grinko R.M.

Poltava State Medical University

Poltava, Ukraine

Department of Pathological Anatomy with Autopsy Course

Introduction. The gold standard to discover the pathogenesis and further form treatment strategy for new diseases remains autopsies. Inevitable truth, humanity encountered a pandemic, so medical science is in need to study the pathology of COVID-19. That's why we need further researches and here is the representation of research conclusions by the start of 2022 year.

Aim. The aim of the article was to analyze and summarize the available scientific literature regarding COVID-19 postmortem cases. The intent was to conduct a meta-analysis to compare previously published autopsy findings in patients with COVID-19 to findings in other lung tissue damage associated deaths.

Materials and methods. An electronic search was performed in PubMed database. Key-words used for search were: "COVID-19", "SARS-COV-2", "Histopathology", "Morphology", "Alveolar Damage", "Autopsy". The search included 17,142 articles using mentioned search terms. After a careful review by two independent researchers, 72 articles were considered relevant and 30 articles was used for full analysis and extraction of information for analysis. Total count of mentioned COVID-19 autopsies used is 71. Every patient included in analysis in researches had COVID-19 associated pneumonia confirmed by a PCR-test. Search was finished on January 20, 2022. Research included studies in English language. Statistical significance calculated at P-value <0.05. Analyses were performed using Review Manager 5 and IBM SPSS Statistics 22.

Results. COVID-19 patients in majority showed signs of diffuse alveolar damage (DAD), with most cases manifesting early acute DAD. Combined prevalence was stated 80.89 (58.21-97.34)% (P<0,01) for COVID-19 cases, calculated by the results of 21 researches, which heterogeneity is 75%. Histologic features indicating different phases of alveolar damage reported in autopsies included acute, proliferative, mixed acute/proliferative and fibro-chronic damage. Pulmonary embolism, either with associated thrombosis of deep veins either without, was present in COVID-19 associated cases and control group of patients in a ratio of 8 to 1. The thrombi were consisting of fibrin and/or platelets located in small peripheral vessels, with few cases (<9%) showing thrombi that was found in peripheral medium-sized vessels and the pulmonary artery. In the study both lungs from COVID-19 infected showed thrombi dislocated in more than fourth part of the lung tissue associated with elevation of D-dimer in 56,4% of patients. Alveolar capillary microthrombi were 10 times as prevalent in COVID-19 infected samples as in patients with other disease. Due to those changes, the weight of the lung samples on autopsy was very various, more than 3,5 times heavier compared to average normal lung weight on autopsy (1260g to 350g).

Conclusion. Research on the pathogenesis of covid-associated pneumonia has not yet reached its peak, and although we have an idea of the histopathological changes in patients compared with the data at the beginning of the pandemic, it remains difficult to accurately predict the course of the disease for a successful treatment. Atopsy findings and biopsies could play an essential role in understanding the pathophysiology of SARS-CoV-2 infection.

MORPHOLOGICAL MANIFESTATIONS OF SIDE EFFECTS CAUSED BY THE RADIOCONTRAST AGENT TOMOHEXOL IN THE FORM OF TYPE I HYPERSENSITIVITY REACTION IN A PATIENT WITH ARTERIOSCLEROSIS OBLITERANS OF THE LOWER EXTREMITIES (CASE REPORT)

Twum C., Borysenko V., Adeyemi O.O., Okoye G.G.

Supervisors: PhD, MD, Assoc.Prof. Sovgyrya S.M., assistant Zadvornova A.P.

Poltava State Medical University

Poltava, Ukraine

Department of Pathological Anatomy with sectional course

Introduction: Today radiocontrast agents are widely used for their ability to contrast and visualise the vascular bed in most human tissues and organs. The agents can be grouped according to their chemical structure into monomers and dimers, as well as ionic and non-ionic compounds. The active agent in Tomohexol 350 is iohexol – a non-ionic monomeric iodinated and water soluble radiocontrast agent. Hypersensitivity reactions are rare with the use of these type of compounds, however they can in some instances cause anaphylactic shock.

Medical history: Patient K., 62 years old, brought to the department of vascular surgery with a previous diagnosis of critical limb ischemia (CLI) of the left extremity, admitted for angiography and possible surgical treatment. On admission the patient's overall condition was satisfactory, he complained about pain in the lower left extremity. The patient had a long history of suffering from atherosclerosis. In the last two weeks he noticed a deterioration of his condition and pain in the lower left extremity. The patient did not indicate allergies to medications in his questionnaire.

Examination (pathological changes): In the department, the patient underwent laboratory and clinical examinations. The results were as such:

The ultrasound result of vessels in the lower left extremity showed arteriosclerosis obliterans of lower extremities, parietal thrombosis of the femoral artery, occlusion in the distal popliteal artery of the lower left extremity.

The patient has been consulted by a cardiologist, allergist and neurologist.

Treatment/results: It was decided to conduct angiographies of pelvis and lower left extremity, as treatment with various medications was ineffective. During the procedure, the patient developed asystole following intra-arterial administration of 50ml of Tomohexol 350. A tryptase analysis was conducted with a result of 46.7g/L. Despite intensive therapy, administration of adrenergic agonists and artificial lung ventilation, the patient's condition progressively deteriorated. The patient died after 2.5 hours from the moment of Tomohexol administration.

The autopsy revealed pale skin on lower extremities with "marble" pattern of indistinct spots, reddish-purple in colour; massive haemorrhaging into the soft tissues of both thighs and anterior abdominal wall; vacant heart chambers and pulmonary trunk, thin blood in vessels, multiple haemorrhages beneath endocardium of the left ventricle. Upon histologic investigation of the sectioned material there were signs of mast cell degranulation, interstitial oedema, microcirculation disorders in internal organs with deposition of blood in venous bed, diffuse ischemic damage of some cardiomyocytes, small haemorrhage foci in adrenal glands, morphological and functional changes in the thyroid gland, necrosis of renal tubule epithelium.

Differential diagnosis/discussion: Clinical and morphological signs of an anaphylactic shock in the patient coincide with typical manifestations of type I hypersensitivity reactions as described in literature, which allows to confirm the diagnosis.

Key words: anaphylactic shock, Tomohexol, mast cell degranulation, tryptase, drug side effects.

МОРФОЛОГІЧНІ ПРОЯВИ УРАЖЕННЯ ЛЕГЕНЬ ПРИ ПНЕВМОНІЇ СПРИЧИНЕНІЙ ВІРУСОМ SARS-COV-2

MORPHOLOGICAL MANIFESTATIONS OF PULMONARY LESIONS IN PNEUMONIA CAUSED BY SARS-COV-2 VIRUS

Беляєва Антоніна Олександрівна, Башлик Дмитро Іванович, Єнгаличев Тимур Равільович, Шепетько Юлія Олексіївна

Belyaeva A.A., Bashlyk D.I., Iengalychev T.R., Shepetko Y.O

Науковий керівник: к.мед.н., доц. Філенко Борис Миколайович, к.мед.н., доц. Ройко Наталія Віталіївна

Scientific adviser: assoc. prof. Fylenko B.M., PhD, MD, assoc. prof. Roiko N.V., PhD, MD

Полтавський державний медичний університет

м. Полтава, Україна

Кафедра патологічної анатомії з секційним курсом

Актуальність: глобальне поширення SARS-CoV-2 та тисячі смертей, спричинених коронавірусною хворобою (COVID-19), змусили Всесвітню організацію охорони здоров'я оголосити пандемію 12 березня 2020 року, яка триває і досі. Інфекція Covid-19 характеризується клінічною мінливістю: частина населення є безсимптомними носіями, у деяких пацієнтів розвиваються легкі симптоми, а в інших швидко прогресує гостра дихальна недостатність, що потребує лікування у відділенні інтенсивної терапії. Незважаючи на численні дослідження, патогенез Covid-19 до кінця не вивчений. Основним морфологічним проявом у легенях при COVID-19 є дифузне альвеолярне пошкодження (ДАП), патологічні процеси при якому протікають у 2 стадії: ранню та пізню. Актуальність патологоанатомічної інформації неодноразово підкреслювалась, тому знання про морфологічні зміни в різні фази інтерстиційної пневмонії Covid-19 повинні постійно поповнюватись.

Мета: дослідити мікроскопічні зміни легень у пізню стадію при пневмонії, спричиненій вірусом SARS-COV-2.

Матеріали та методи: при дослідженні проводили ретроспективний аналіз 15 протоколів патологоанатомічних розтинів трупів, померлих від COVID-19 та вивчення архівних гістологічних препаратів, забарвлених гематоксиліном і еозином.

Результати: у легенях були виявлені гістологічні ознаки ДАП з наявністю гіалінових мембран, інтерстиціального та внутрішньоальвеолярного білкового набряку, що був представлений еозинофільним пінистим вмістом в просвітах альвеол, гіперплазії пневмоцитів II типу, внутрішньобронхіальні та інтраальвеолярні крововиливи. Гіперплазія альвеолоцитів була чітко виявлена в 11 з 15 випадків, що проявлялося невеликими їх скупченнями або значними