LITERATURE SURVEY

1) Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study

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Background: In December, 2019, a pneumonia associated with the 2019 novel coronavirus (2019-nCoV) emerged in Wuhan, China. We aimed to further clarify the epidemiological and clinical characteristics of 2019-nCoV pneumonia.

Methods: In this retrospective, single-centre study, we included all confirmed cases of 2019-nCoV in Wuhan Jinyintan Hospital from Jan 1 to Jan 20, 2020. Cases were confirmed by real-time RT-PCR and were analysed for epidemiological, demographic, clinical, and radiological features and laboratory data. Outcomes were followed up until Jan 25, 2020.

Findings: Of the 99 patients with 2019-nCoV pneumonia, 49 (49%) had a history of exposure to the Huanan seafood market. The average age of the patients was 55·5 years (SD 13·1), including 67 men and 32 women. 2019-nCoV was detected in all patients by real-time RT-PCR. 50 (51%) patients had chronic diseases. Patients had clinical manifestations of fever (82 [83%] patients), cough (81 [82%] patients), shortness of breath (31 [31%] patients), muscle ache (11 [11%] patients), confusion (nine [9%] patients), headache (eight [8%] patients), sore throat (five [5%] patients), rhinorrhoea (four [4%] patients), chest pain (two [2%] patients), diarrhoea (two [2%] patients), and nausea and vomiting (one [1%] patient). According to imaging

examination, 74 (75%) patients showed bilateral pneumonia, 14 (14%) patients showed multiple mottling and ground-glass opacity, and one (1%) patient had pneumothorax. 17 (17%) patients developed acute respiratory distress syndrome and, among them, 11 (11%) patients worsened in a short period of time and died of multiple organ failure.

Interpretation: The 2019-nCoV infection was of clustering onset, is more likely to affect older males with comorbidities, and can result in severe and even fatal respiratory diseases such as acute respiratory distress syndrome. In general, characteristics of patients who died were in line with the MuLBSTA score, an early warning model for predicting mortality in viral pneumonia. Further investigation is needed to explore the applicability of the MuLBSTA score in predicting the risk of mortality in 2019-nCoV infection.

2) Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirusinfected pneumonia in Wuhan, China

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Importance In December 2019, novel coronavirus (2019-nCoV)–infected pneumonia (NCIP) occurred in Wuhan, China. The number of cases has increased rapidly but information on the clinical characteristics of affected patients is limited.

Objective To describe the epidemiological and clinical characteristics of NCIP.

Design, Setting, and Participants Retrospective, single-center case series of the 138 consecutive hospitalized patients with confirmed NCIP at Zhongnan Hospital of Wuhan University in Wuhan, China, from January 1 to January 28, 2020; final date of follow-up was February 3, 2020.

Exposures Documented NCIP.

Main Outcomes and Measures Epidemiological, demographic, clinical, laboratory, radiological, and treatment data were collected and analyzed. Outcomes of critically ill patients and noncritically ill patients were compared. Presumed hospital-related transmission was suspected if a cluster of health professionals or hospitalized patients in the same wards became infected and a possible source of infection could be tracked.

3) Clinical characteristics of novel coronavirus cases in tertiary hospitals in Hubei province

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Background: The 2019 novel coronavirus (2019-nCoV) causing an outbreak of pneumonia in Wuhan, Hubei province of China was isolated in January 2020. This study aims to investigate its epidemiologic history, and analyze the clinical characteristics, treatment regimens, and prognosis of patients infected with 2019-nCoV during this outbreak.

Methods: Clinical data from 137 2019-nCoV-infected patients admitted to the respiratory departments of nine tertiary hospitals in Hubei province from December 30, 2019 to January 24, 2020 were retrospectively collected, including general status, clinical manifestations, laboratory test results, imaging characteristics, and treatment regimens.

Results: None of the 137 patients (61 males, 76 females, aged 20-83 years, median age 57 years) had a definite history of exposure to Huanan Seafood Wholesale Market. Major initial symptoms included fever (112/137, 81.8%), coughing (66/137, 48.2%), and muscle pain or fatigue (44/137, 32.1%), with other, less typical initial symptoms observed at low frequency, including heart palpitations, diarrhea, and headache. Nearly 80% of the patients had normal or decreased white blood cell counts, and 72.3% (99/137) had lymphocytopenia. Lung involvement was present in all cases, with most chest computed tomography scans showing lesions in multiple lung lobes, some of which were dense; ground-glass opacity co-existed with consolidation shadows or cord-like shadows. Given the lack of effective drugs, treatment focused on symptomatic and respiratory support. Immunoglobulin G was delivered to some critically ill patients according to their conditions. Systemic corticosteroid treatment did not show significant benefits. Notably, early respiratory support facilitated disease recovery and improved prognosis. The risk of death was primarily associated with age, underlying chronic diseases, and median interval from the appearance of initial symptoms to dyspnea.

4) Cardiovascular implications of fatal outcomes of patients with coronavirus disease 2019 (COVID-19)

AUTHORS: T. Guo et al.

Abstract

Importance: Increasing numbers of confirmed cases and mortality rates of coronavirus disease 2019 (COVID-19) are occurring in several countries and continents. Information regarding the impact of cardiovascular complication on fatal outcome is scarce.

Objective: To evaluate the association of underlying cardiovascular disease (CVD) and myocardial injury with fatal outcomes in patients with COVID-19.

Design, setting, and participants: This retrospective single-center case series analyzed patients with COVID-19 at the Seventh Hospital of Wuhan City, China, from January 23, 2020, to February 23, 2020. Analysis began February 25, 2020.

Main outcomes and measures: Demographic data, laboratory findings, comorbidities, and treatments were collected and analyzed in patients with and without elevation of troponin T (TnT) levels.

Conclusions and relevance: Myocardial injury is significantly associated with fatal outcome of COVID-19, while the prognosis of patients with underlying CVD but without myocardial injury is relatively favorable. Myocardial injury is associated with cardiac dysfunction and arrhythmias. Inflammation may be a potential

mechanism for myocardial injury. Aggressive treatment may be considered for patients at high risk of myocardial injury.

5) A neuro-based approach to designing a Wilkinson power divider

AUTHORS: M. Jamshidi, A. Lalbakhsh, S. Lot, H. Siahkamari, B. Mohamadzade, and J. Jalilian

In this paper, a new neuro-based approach using a feed-forward neural network is presented to design a Wilkinson power divider. The proposed power divider is composed of symmetrical modified T-shaped resonators, which are a replacement for quarter-wave transmission lines in the conventional structure. The proposed technique reduces the size of the power divider by 45% and suppresses unwanted bands up to the fifth harmonics. To verify the concept, a prototype of the power divider has been fabricated and tested, exhibiting good agreement between the predicted and measured results. The results show that the insertion loss and the isolation at the center frequency are about 3.3 ± 0.1 dB and 23 dB, respectively.