

## Return to Work for Covid with Kidney Stone Disease: An Occupational Medicine Case Report

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### Abstract

**Background:** There is indirect and strongly disputed evidence suggesting that the epidemic may have begun earlier, including increased hospital traffic, web searches for potential COVID-related symptoms in Wuhan beginning in August 2019 and other information that suggested a potential laboratory shutdown in October 2019. Etiology of Kidney Stones, formation of kidney stones (calculogenesis) is a complex and multifactorial process including intrinsic (such as age, sex, and heredity) and extrinsic factors such as geography, climate, dietary, mineral composition, and water intake. The Occupational Medicine Specialist Treatment based on Covid Return to Work from American College of Occupational and Environmental Medicine.

**Case Presentation:** Woman, 54 yo, Chief complaint was Nausea and vomiting 5 times more, went to the Emergency Room (ER) on September 18<sup>th</sup>, had decreased saturation and positive swab on September 18<sup>th</sup>. He was treated in Kiara RSCM on September 20, the lowest saturation was 91 but was not congested and he was given oxygen therapy. There was a previous history of fever on 15 September, but the clinic's swab was negative, diagnosed with kidney stones. Other complaints include blood pressure rising due to pandemic stress since April and hair loss while being treated in Kiara RSCM. The person concerned takes care of the patient in the ER with the additional task of technical coordination and the person in charge of medical devices. In 1 unit, there are 3 co-workers, namely the nurse in the morning shift. Meanwhile, non-shift nurses consist of 6 people (head nurse, nurse officer, ppi nurse, 2 primary nurses, palliative nurse). There are already 13 positive Covid nurses on the 1st floor of the ER and no one has died. Contact with isolation triage patients and no contact with co-workers.

**Conclusion:** Return to work (RTW) recommendation that's Temporary Unfit, no need for antidotes and chelation, no Ibuprofen NSAID therapy for colic renal. Occupational Education for Uro-Clinic Control, drinking water and limiting acidic food and drinks, 3M Protocol (mask-washing hands-keeping distance), Adhere to putting on and removing the red zone Personal Protective Equipment (PPE). Control with indoor air quality avoid close contact, PPE according to red zone. Early diagnosis of other workers via tracing swab contact, re-swab until negative to return to work. Compensation according to PP no. 44 of 2015 amounting to Rp. 5,400,000 (Indonesian rupiah).

**Keywords:** Covid; Kidney Stone Disease; Return to Work; Occupational Medicine

### Introduction

Novel coronavirus 2019 (COVID-19) is an acute respiratory infection caused by a new strain of coronavirus. The virus has been

named "SARS-CoV-2" and the disease it causes has been variously named "coronavirus disease 2019" (abbreviated "COVID-19"). The

pandemic began in Wuhan, China in November 2019, then expanded markedly throughout the Wuhan region. There is indirect and strongly disputed evidence suggesting that the epidemic may have begun earlier, including increased hospital traffic, web searches for potential COVID-related symptoms in Wuhan beginning in August 2019, and other information that suggested a potential laboratory shutdown in October 2019 [1]. Regardless, the Chinese New Year likely accelerated the spread of the virus through global travel and hastened the development of a pandemic.

Recent studies have reported that the prevalence of urolithiasis has been increasing in the past decades in both developed and developing countries is growing trend is believed to be associated with changes in lifestyle medications such as lack of physical activity and dietary habits and global warming. Etiology of Kidney Stones, formation of kidney stones (calculogenesis) is a complex and multifactorial process including intrinsic (such as age, sex, and heredity) and extrinsic factors such as geography, climate, dietary, mineral composition, and water intake [2].

The Occupational Medicine Specialist Treatment based on Covid Return to Work from American College of Occupational and Environmental Medicine.

### **Case Presentation**

Woman, 54 yo, Chief complaint was Nausea and vomiting 5 times more, went to the Emergency Room (ER) on September 18<sup>th</sup>, had decreased saturation and positive swab on September 18<sup>th</sup>. He was treated in Kiara RSCM on September 20, the lowest saturation was 91 but was not congested and he was given oxygen therapy. There was a previous history of fever on 15 September, but the clinic's swab was negative, diagnosed with kidney stones. Other complaints include blood pressure rising due to pandemic stress since April and hair loss while being treated in Kiara RSCM.

Family history includes hypertension and asthma. The patient is sterile, menstruating smoothly, and denies suffering from sexually transmitted diseases. The husband works as a private employee, lives in the house of the nuclear family (5 people, namely husband, wife and 3 children), works with the husband during the pandemic using his own car.

The person concerned takes care of the patient in the ER with the additional task of technical coordination and the person in charge of medical devices. In 1 unit, there are 3 co-workers, namely

the nurse in the morning shift. Meanwhile, non-shift nurses consist of 6 people (head nurse, nurse officer, ppi nurse, 2 primary nurses, palliative nurse). There are already 13 positive Covid nurses on the 1<sup>st</sup> floor of the ER and no one has died. Contact with isolation triage patients and no contact with co-workers.

On examination found rhonchi in the lungs, knock pain of the right and left costovertebral junction. From the supporting examination, it was found that the PCR test swab (+), increased creatinine urine, increased OT/PT, increased Procalcitonin, increased LDH/ferritin, increased D-dimer/CRP. Thoracic X-ray suspected pneumonia, chest CT covid pneumonia type, bilateral medullary nephrocalcinosis ultrasound. The results of the Brief Survey showed moderate risk on the hands, neck, back.

Shows a positive relationship, such as Strength, Experiment and Analogy between Covid exposure and Nurse job. Where working in the triage/isolation/red zone of the ER exposed to aerosols, it is necessary to contact tracing by experts and personnel according to the key job and the work sector. Meanwhile, nephrolithiasis did not show a relationship with occupational exposure. The results of our meta-analysis show that COVID-19 affects the kidney function in many ways, the most prominent being proteinuria, rise of BUN, and rise of GFR. The results also show a considerable rate of Acute Kidney Injury (AKI) in the COVID-19-infected patients [3]. There are no other activities apart from being with family, nothing has been confirmed. A history of negative PCR swab examination in the patient's family.

Based on The Seven Steps of Occupational Diagnosis, it could be concluded that the woman diagnosed with Occupational Covid and non job related Kidney Stone Disease.

### **Discussion**

In the systemic hyperinflammation phase of COVID-19 proposed by Siddiqi and Mehra, there is a significant elevation of inflammatory cytokines and biomarkers, such as interleukin (IL)-2, IL-6, IL-7, granulocyte-colony stimulating factor, macrophage inflammatory protein 1- $\alpha$ , tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), CRP, ferritin, PCT, and D-dimer. This stage consists of the most severe manifestation of the cytokine storm, in which excessive hyperinflammation may lead to cardiopulmonary collapse and multi-organ failure.

This meta-analysis of 13 studies showed that an elevated serum CRP was associated with an increased composite poor outcome

[RR 1.84 (1.45, 2.33), p < 0.001; I<sub>2</sub>: 96%, p < 0.001]. An elevated PCT was associated with an increased composite poor outcome [RR 3.92 (2.42, 6.35), p < 0.001; I<sub>2</sub>: 85%, p < 0.001] in 16 studies. The meta-analysis of 11 studies showed that an elevated D-dimer was associated with an increase in composite poor outcome [RR 2.93 (2.14, 4.01), p < 0.001; I<sub>2</sub>: 77%, p < 0.001]. Patients with a composite poor outcome had a higher ferritin level [SMD 0.90 (0.64, 1.15), p < 0.0001; I<sub>2</sub>: 76%] in 10 studies [4].

Previously, we reported a possible association between male patients hospitalized with COVID-19 and androgenetic alopecia (AGA); however, the study was limited by its population size of 41 men. In this communication, we present additional data from patients with confirmed COVID-19 admitted due to severity criteria (mainly low peripheral oxygen saturation) to 3 tertiary hospitals in Madrid, Spain. The patients were randomly examined by dermatologists who were assisting with the overwhelming number of admitted patients. The study took place from March 23, 2020, to April 12, 2020. A total of 175 individuals with confirmed COVID-19 were evaluated. Among the patients, 122 were men and 53 were women. Overall, 67% of the patients (95% confidence interval, 60% - 74%) presented with clinically relevant AGA. The frequency of AGA in men was 79% (95% confidence interval, 70% - 85%) The frequency of AGA in women was 42% (95% confidence interval, 29%-55%). The median age of female patients was 71 years (interquartile range, 22 years). The median age of male patients was 62.5 years (interquartile range, 20 years) [5].

However, it should be noted that stone formation is usually dependent on the level of imbalance between urinary inhibitors and promoters of crystallization [2]. All stones share similar events with respect to the mineral phase of stone formation. But, the sequence of events leading to stone formation differs depending on the type of stone and urine chemistry. For instance, crystallization of calcium-based stones (calcium oxalate or calcium phosphate) occurs in supersaturated urine if it is with low concentrations of inhibitors. Uric acid interferes the solubility of calcium oxalate and promotes CaOx stone formation. In healthy controls, crystallization process is opposed by inhibitory substances and gets safe. The sequence of events that trigger stone formation includes nucleation, growth, aggregation, and retention of crystals within the kidneys.

Effective kidney stone prevention depends upon addressing the cause of stone formation. Generally, to prevent the first episodes of

kidney stone formation or its secondary episodes, proper management of diet and the use of medications is required. Primary prevention of kidney stone disease via dietary intervention is low-cost public health initiative with massive societal implications. Thus, nutritional management is the best preventive strategy against urolithiasis [2]. For prevention of calcium oxalate, cystine, and uric acid stones, urine should be alkalinized by eating a diet high in fruits and vegetables, taking supplemental or prescription citrate, or drinking alkaline mineral waters. For uric acid stone formers, gout needs to be controlled, and for cystine stone formers, sodium and protein intakes need to restricted. For prevention of calcium phosphate and struvite stones, urine should be acidified. For struvite stones, acidifying the urine is the single most important step. Patients must receive careful follow-up to be sure that the infection has cleared. However, the current treatment modalities are not efficient to prevent urolithiasis, and further research is required.

There were no reports on possible associations between COVID-19 and urolithiasis [6]. However, non-steroidal anti-inflammatory drugs (NSAIDS), a medication commonly used to alleviate stone-related colicky pain has raised concerns in the community. Fang, et al. [6] reported that upregulation of ACE2 might increase the risk of developing severe and fatal COVID-19. NSAIDS also increases ACE2 and there is a worry that it might induce similar effect. US Food and Drug Administration recently announced that there was not enough scientific evidence connecting the use of NSAIDs, such as ibuprofen, with worsening COVID-19 symptoms. Therefore, the use of NSAIDs in renal colic management should still follow established indications.

Return to work (RTW) recommendation that's Temporary Unfit, no need for antidotes and chelation, no Ibuprofen NSAID therapy for colic renal. Occupational Education for Uro-Clinic Control, drinking water and limiting acidic food and drinks, 3M Protocol (mask-washing hands-keeping distance), Adhere to putting on and removing the red zone Personal Protective Equipment (PPE.) Control with indoor air quality, avoid close contact, PPE according to red zone. Early Diagnosis of other workers via Tracing Swab Contact, Re-swab until negative to return to work. Fit to work is obtained Healthy and returns to work on October 5, 2020. Compensation for Covid Disability due to Work and the "RTW Program" is not required because there is no handicap.

Disability assessment (ICF WHO) [7] with Impairment Covid19 due to work, body function b4400.1 Respiratory Rate, MILD prob-

lem; body structure s43011.176 Alveoli, Mild problem, qualitative change, proximal; Disability: Malaise, d4154.1 Maintenance standing Position, Mild; environment e2601.3 Indoor air quality. Severe problem. The 0% percentage of disability (Criteria for Rating Impairments of Station, Gait, and Movement Disorders according to AMA 5<sup>th</sup> edition) is due to requiring a spirometry examination. Compensation according to PP no. 44 of 2015 [8] amounting to Rp. 5,400,000 (Indonesian rupiah).

## Conclusion

That's 2 diagnose for this patient, with Occupational Covid and Non Job Related Kidney Stone Disease although Covid could affected acute kidney injury but there were no reports on possible associations between COVID-19 and urolithiasis.

There is a significant elevation of inflammatory cytokines and biomarkers, such as interleukin (IL)-2, IL-6, IL-7, granulocyte-colony stimulating factor, macrophage inflammatory protein 1- $\alpha$ , tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), CRP, ferritin, PCT, and D-dimer. This stage consists of the most severe manifestation of the cytokine storm, in which excessive hyperinflammation may lead to cardiopulmonary collapse and multi-organ failure. In this communication, we present additional data from patients with confirmed COVID-19 admitted due to severity criteria (mainly low peripheral oxygen saturation) to 3 tertiary hospitals in Madrid, Spain. Fang, *et al.* reported that upregulation of ACE2 NSAID at Colic Renal, especially Ibuprofen might increase the risk of developing severe and fatal COVID-19.

Return to work (RTW) recommendation that's Temporary Unfit, no need for antidotes and chelation, no Ibuprofen NSAID therapy for colic renal. Occupational Education for Uro-Clinic Control, drinking water and limiting acidic food and drinks, 3M Protocol (mask-washing hands-keeping distance), Adhere to putting on and removing the red zone Personal Protective Equipment (PPE). Control with indoor air quality avoid close contact, PPE according to red zone. Early Diagnosis of other workers via Tracing Swab Contact, Re-swab until negative to return to work. Compensation according to PP no. 44 of 2015 amounting to Rp. 5,400,000 (Indonesian rupiah).

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