Original Research Article

Comparison Study of Lung Involvement in Vaccinated and Un Vaccinated Covid Patients

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Abstract

Introduction:Comparison study of lung involvement in vaccinated and un vaccinated covid patients and clinical manifestations are many and varied;imaging plays a primary role in the diagnosis.**Aim:**The purpose of study was efficiency of vaccine in vaccinated population with covid positive and compare with unvaccinated covid patients.**Materials and methods**: It was case control study done in 206 patients, all patients with clinical and positive laboratory findings, confirmed by RTPCR/Rapid antigen test. undergone a standardized HRCT chest imaging protocol. **Results:** Lung parenchymal involvement more common in unvaccinated population compare with vaccinated population. **Conclusion**: efficacy of vaccine in vaccinated group and unvaccinated group

Keywords: efficiency, vaccinated, high-resolution computed tomography, lung involvement

Introduction

Coronaviruses are a family of viruses that can cause illnesses such as the common cold, severe acute respiratory syndrome (SARS), In 2019, a new coronavirus was identified as the cause of a disease outbreak that originated in China. The virus is now known as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease it causes is called coronavirus disease 2019 (COVID-19). In March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic[2].Infection with the new coronavirus (severe acute respiratory syndrome coronavirus 2, or SARS-CoV-2) causes coronavirus disease 2019 (COVID-19).The virus that causes COVID-19 spreads easily among people, data has shown that it spreads mainly from person to person among those in close contact (within about 6 feet). The virus spreads by respiratory droplets released when someone with the virus coughs, sneezes, breathes or talks. These droplets can be inhaled or land in the mouth, nose or eyes of a person nearby.In some situations, the COVID-19 virus can spread by a person being exposed to small droplets or aerosols that stay in the air for several minutes or hours — called airborne transmission. Risk factors for COVID-19 appear to include Close contact (within 6 feet) with someone who has COVID-19 and being coughed or sneezed on by an infected person.Signs and symptoms of coronavirus disease 2019 (COVID-19) may appear two to 14 days after exposure. This time after exposure and before having symptoms is called the incubation period. Common signs and symptoms can include: fever, cough, tiredness, early symptoms of COVID-19 may include a loss of taste or smell. other symptoms can include:shortness of breath or difficulty breathing muscle aches, sore throat, headache, chest pain and diarrhoea[1].Children have similar symptoms to adults and generally have mild illness.

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The severity of COVID-19 symptoms can range from very mild to severe. some people may have only a few symptoms, and some people may have no symptoms at all. Some people may experience worsened symptoms, such as worsened shortness of breath and pneumonia, about a week after symptoms start. People who are older have a higher risk of serious illness from COVID-19, and the risk increases with age. People who have existing medical conditions also may have a higher risk of serious illness.Certain medical conditions that may increase risk of serious illness from Covid19 as Heart disease, Cancer, Chronic obstructive pulmonary disease, Diabetes, Obesity, Hypertension, smoking, chronic kidney disease, weakened immune system, asthma, liver disease . other underlying medical conditions may increase your risk of serious illness from COVID-19. Although most people with Covid-19 have mild to moderate symptoms, the disease can cause severe medical complications and lead to death in some people. Older adults or people with existing medical conditions are at greater risk.Complications can include Pneumonia and shortness breath, multi organ failure, heart problems, like myocarditis, cardiac failure, myocardial infarction, acute respiratory distress syndrome, disseminated intra vascular coagulation, acute kidney injury and additional viral and bacterial infections. On HRCT, Ground glass opacities refers to the area of the increased lung opacity in which underlying broncho vascular markings are not obscured.GGO is the most common manifestation of Covid-19 pneumonia. Bilateral lower lobes are most commonly involved. multi lobar subpleural ground glass opacities are seen in most cases. However, COVID-19 pneumonia may manifest as unilateral GGO even before the onset of symptoms with rapid evolution into diffuse, bilateral disease.

Materials and Methods

It was case control study done at Department of radiology, Government General Hospital, Nizamabad tertiary care centre, in all patients with RTPCR positive and clinical suspicious of COVID. Undergone a standardized HRCT chest imaging protocol. The numbers of patients proposed to be included in the study are two hundred and six. CT Images of the chest were obtained on a siemens, 16slice multidetector CT Unit. and slice section of 5 mm.

Conducted study to compare lung involvement in vaccinated and unvaccinated groups.
Images of all patients were reviewed independently by 2 experienced radiologists, blinded to the patients' names and clinical or other laboratory findings.
Each observer viewed CTSI per patient separately, in this manner, image analysis was divided into mild, moderate, severe and no lung involvement groups for each vaccinated and unvaccinated group.
In all cases, CT severity scoring was calculated per each of the 5 lobes considering the extent of anatomic involvement, as follows (3)
0-No involvement
1- < 5% involvement
2- 5–25% involvement
3- 26–50% involvement
4- 51–75% involvement; and
5- > 75% involvement
The resulting CTSI score was the sum of each individual lobar score and (0 to 25).

Results

Total 206 population include vaccinated (26) and control group (unvaccinated,180) with covid positive are studied in government general hospital, Nizamabad in period between first April 2021 to 25th April.
Lung involvement more common in the unvaccinated population in our study, 160(88%) members out of 180 members and less common in vaccinated group, only three members have lung involvement in our study,3(12%) members out of 26 members.

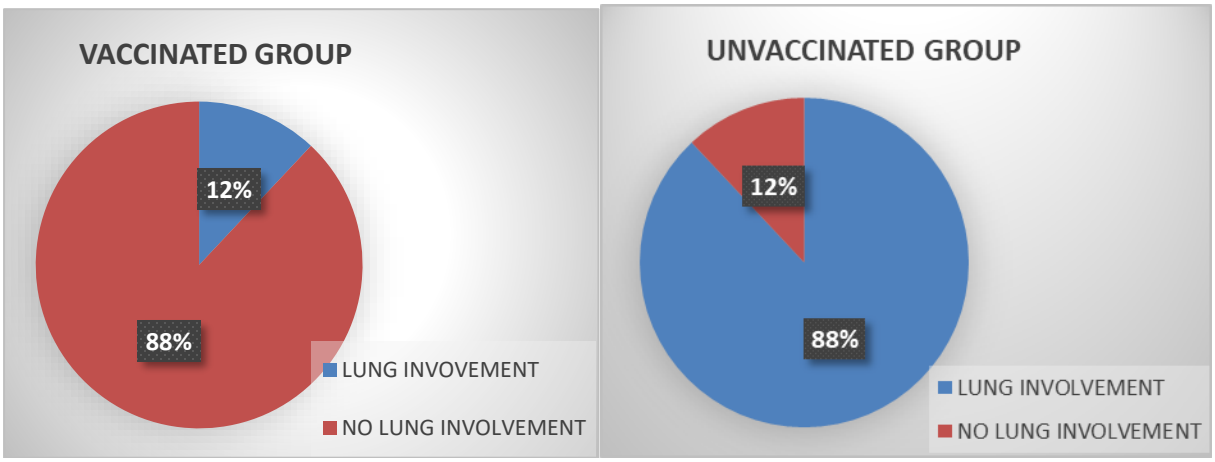

Fig 1: Lung involvement in vaccinated and unvaccinated groups

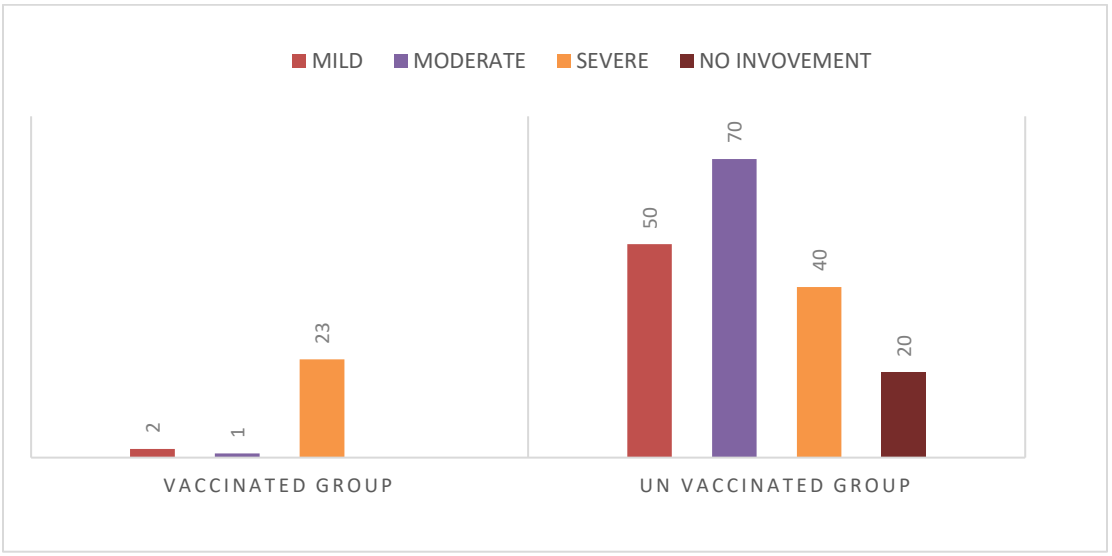

Fig 2: Severity of lung involvement in Both groups

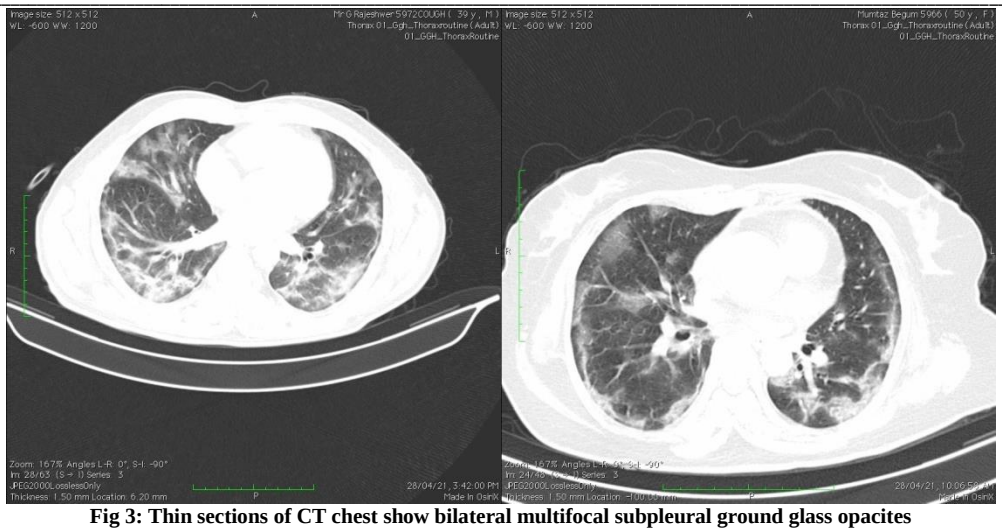

Fig 3: Thin sections of CT chest show bilateral multifocal subpleural ground glass opacites

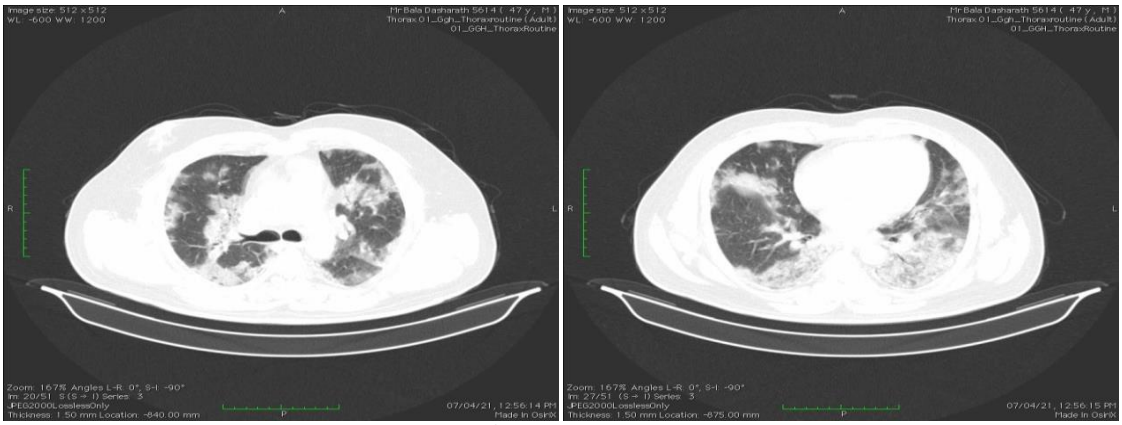

Fig 4:CT chest: shows patchy areas of GGO and consolidation in periphery in upper lobes

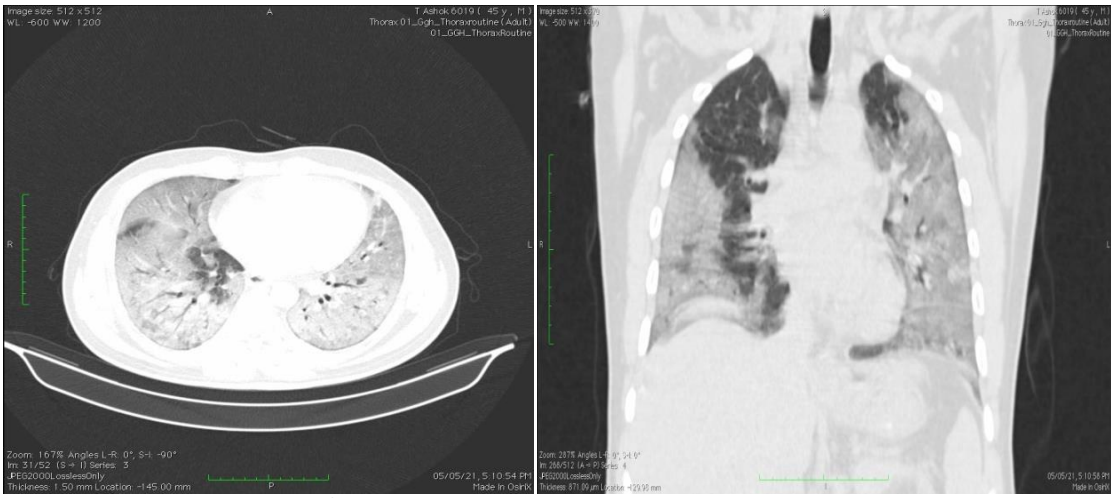

Fig 5: CT chest: shows bilateral multifocal subpleural and peribranchial ground glass opacites and reticulation -crazy -paving appearance

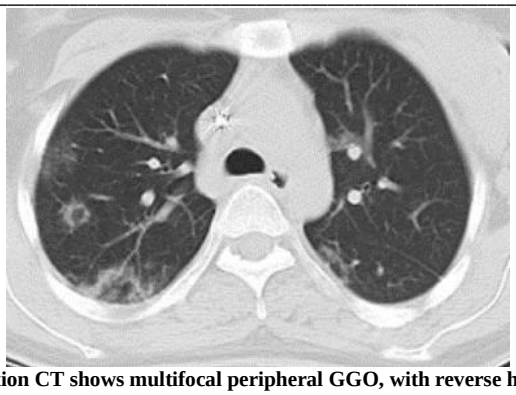

Fig 6: Thin section CT shows multifocal peripheral GGO, with reverse halo appearance

Discussion

Two hundred and six patients diagnosed of covid were examined with HRCT chest imaging at our hospital. 26 out of 206 are frontline workers taken two doses of covishield vaccine and 180 out of 206 members are control group, not taken vaccination.Vaccinated group (26 members) have mild symptoms and only one person have moderate symptoms, only three people have lung involvement (12%) out of 26 members and CTSI showing in the people have:3-8 and control group (180 members) have mild to severe symptoms and CT chest imaging shows 88% persons (160) have lung involvement, CTSI showing 3-21.Two versions of the vaccine – produced by AstraZeneca-SKBio (Republic of Korea) and the Serum Institute of India – have been listed for emergency use by WHO. When the vaccine underwent SAGE consideration, it had undergone review by the European Medicines Agency (EMA). The EMA has thoroughly assessed the data on the quality, safety and efficacy of the vaccine and has recommended granting a conditional marketing authorisation for people aged 18 and above. The covishield vaccine against COVID-19 has an efficacy of 88% against symptomatic SARS-CoV-2 infection, Longer dose intervals within the 8 to 12 weeks range are associated with greater vaccine efficacy. SAGE has reviewed all available data on the performance of the vaccine in the settings of variants of concern. SAGE currently recommends the use of AZD1222 vaccine according to the WHO Prioritization Roadmap, even if virus variants are present in a country. Countries should assess the risks and benefits taking into consideration their epidemiological situation.No substantive data are available related to impact of AZD1222 on transmission or viral shedding. In the meantime, we must maintain and strengthen public health measures that work: masking, physical distancing, handwashing, respiratory and cough hygiene, avoiding crowds, and ensuring good ventilation. As of 19 April 2021, the AstraZeneca vaccine is safe and effective at protecting people from the extremely serious risks of COVID-19, including death, hospitalization and severe disease. The Council for International Organizations of Medical Sciences classifies rates of adverse events or medicines and vaccines as follows as Very common >1/10, Common (frequent) > 1/100 and < 1/10, Uncommon (infrequent) >1/1000 and < 1/100, Rare> 1/10000 and <1/1000 and Very rare < 1/10000.People with a history of severe allergic reaction to any component of the vaccine should not take it and the vaccine is not recommended for persons younger than 18 years of age pending the results of further studies. The recommended dosage is two doses given intramuscularly (0.5ml each) with an interval of 8 to 12 weeks, additional research is needed to understand longer-term potential protection after a single dose.

Vaccination at Govt general hospital,Nizamabad,Dated:19/01/2021

Some countries in the European Union have temporarily suspended use of the AstraZeneca COVID-19 vaccine as a precautionary measure based on reports of rare blood coagulation disorders in persons who had received the vaccine. Other countries in the EU – having considered the same information - have decided to continue using the vaccine in their immunization programmes. vaccination against COVID-19 will not reduce illness or deaths from other causes. Thromboembolic events are known to occur frequently. Venous thromboembolism is the third most common cardiovascular disease globally. WHO is in regular contact with the European Medicines Agency and regulators around the world for the latest information on COVID-19 vaccine safety? The WHO COVID-19 Subcommittee of the Global Advisory Committee on Vaccine Safety is carefully assessing the latest available safety data for the AstraZeneca vaccine. Once that review is completed, WHO will immediately communicate the findings to the public. At this time,

WHO considers that the benefits of the AstraZeneca vaccine outweigh its risks and recommends that vaccinations continue. Coronavirus disease 2019 (COVID-19) vaccine shortages have led some experts and countries to consider untested dosing regimens. We studied antibody responses to a single dose of the Pfizer-BioNTech or Moderna vaccines in healthcare workers (HCW) with laboratory-confirmed COVID-19 infection and compared to them to antibody responses of HCW who were IgG negative to SARS-CoV-2 spike protein. HCW with prior COVID-19 showed clear secondary antibody responses to vaccination with IgG spike binding titers rapidly increasing by 7 days and peaking by days 10 and 14 post-vaccination. At all time points tested, HCW with prior COVID-19 infection showed statistically significant higher antibody titers of binding and functional antibody compared to HCW without prior COVID-19 infection. In times of vaccine shortage, and until correlates of protection are identified, our findings preliminarily suggest the following strategy as more evidence-based: a) a single dose of vaccine for patients already having had laboratory-confirmed COVID-19; and b) patients who have had laboratory-confirmed COVID-19 can be placed lower on the vaccination priority list.

Both the Pfizer BioNTech and the Oxford AstraZeneca vaccines are highly effective in reducing covid-19 infections and protecting against severe disease in older adults. Analysis by Public Health England, published as a preprint, estimated that a single dose of either vaccine is around 80% effective at preventing hospital admission in people aged over 80, three to four weeks after the first dose. A single dose of the Pfizer vaccine also led to an 85% reduction in deaths from covid-19 in people aged 70 and over, the study suggested[4].

Among people aged 70 and over, protection against symptomatic covid-19 after a single dose of the Pfizer vaccine reached 61% (95% confidence interval 51% to 69%) from 28 to 34 days after vaccination then plateaued. Protection after a single dose of the Oxford Astra-Zeneca vaccine reached 60% (95% CI 41% to 73%) from 28 to 34 days and increased to 73% (95% CI 27% to 90%) from day 35 onwards. Protection after two doses of the vaccine increased to around 85-90%.People aged 80 and over who had one dose of Pfizer's vaccine and still developed symptoms had an additional 43% (95% CI 33% to 52%) lower risk of emergency hospital admission and an additional 51% (95% CI 37% to 62%) lower risk of death. Those vaccinated with one dose of the Oxford AstraZeneca vaccine had an additional 37% (95% CI 3% to 59%) lower risk of emergency hospital admission, but there was insufficient follow-up data to assess mortality.

Conclusion

The ages of the patients ranged from 28 year to 80 years (mean 50 years) with peak incidence being in the age group of 35 to 60 years. total 26 vaccinated and 180 control group (unvaccinated) with RTPCR/Rapid antigen test positive/ covid patients are studied in government general hospital, Nizamabad in period between first April 2021 to 25th April. 26 members are frontline workers taken two doses of covishield vaccine in government general hospital, includes doctors, staff nurses and para medical staff, have mild symptoms with RTPCR/ Rapid antigen test positive, HRCT done these patients after 4-5days after symptoms.180 members are admitted in our hospital, which are not taken vaccine, with mild to severe symptoms with RTPCR/ Rapid antigen test positive, HRCT done these patients. Lung involvement more common in the unvaccinated population,160(88%) with CTSI showing 3-21, compare with vaccinated group, in which only three members have lung involvement,3(12%) with CTSI:3-8.

Conflict of Interest: Nil
Source of support:Nil

References

1. Salehi S, Abedi A et al. Coronavirus disease 2019(COVID-19): a systematic review of imaging findings in 919 patients 2020. AJR 2020:2151–7.
2. https://www.who.int/health-topics/coronavirus#tab=tab_
3. Prokop M,Van Everdingen W, Van Rees Vellinga T. CO-RADS:a categorical CT assessment scheme for patients suspected of having COVID-19 definition and evaluation. Radiology. 2020;296:E97–E104
4. Saman Saadat, Profile Zahra Rikhtegaran Tehrani, Profile James Logue, Michelle Newman, Profile Matthew B. Frieman, Anthony D. Harris, Profile Mohammad M. Sajadi. BMJ 2021; 372