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Clinical findings post hospital discharge in patients with covid-19: A telephone interview study

Abstract

Importance: Active COVID-19 symptoms like cough, shortness of breath, fever, sore throat and others are well established. However, there is limited information on the persistence of symptoms post infection.

Objective: To identify the post discharge symptoms amongst adult patients discharged from the hospital after having been hospitalized and treated for COVID-19 from March to the end of May of 2020.

Design, setting, and participants: Adult patients discharged from the hospital after admission for COVID-19 infection were contacted via a telephone encounter as a post-discharge follow-up, which ranged from 9 to 92 days with an average of 57 days post discharge. A standardized questionnaire was used during post discharge telephone encounter for the patients to assess presence or absence of symptoms following discharge.

Main outcomes and measures: Chi-square statistics were used to calculate unadjusted associations between predictors and the symptom status outcome, and Fisher's exact statistic was used in the case of rare events/low cell counts. A multivariable logistic regression model was used to determine any association between the predictors and the outcome of still being symptomatic versus having improved symptoms at follow-up date. Firth's logistic regression was applied to the analysis in order to handle sample bias as well as low cell counts.

Results: Out of the 337 patients who were discharged after COVID-19 hospitalization, 180 had successful post discharge telephone encounters. The majorities of the patients were male, 108 (60%) and belonged to the age group, 35-64 years. Out of 180 patients, 151 (83.88%) were asymptomatic and 29 (16.11%) were still symptomatic. Of the 29 symptomatic patients, the most common symptoms reported were persistent fever, 19 (65.52%), shortness of breath, 19 (65.52%) and cough, 25 (86.21%).

Conclusion and relevance: The majority of patients discharged from the hospital where they had been attended for COVID-19 were asymptomatic post discharge. Our study identified that a proportion of patients could remain symptomatic after COVID 19 hospitalization. The importance of follow up post hospital discharge is highlighted in this study.

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Introduction

At the end of 2019, the world faced the worst pandemic since the Spanish flu and the biggest outbreak our generation had encountered. Cases of coronavirus disease 2019 (COVID-19) were reported in the region of Wuhan, China, at the beginning of December 2019 and rapidly spread across the world reaching more than 188 countries. On March 11, 2020, the World Health Organization declared the COVID-19 outbreak a pandemic.[1] In New York City (NYC) the first documented cases were reported in early March 2020, followed by a rapid and unexpected surge, when the city became the epicenter of the disease. As of May 2020, in NYC alone, the total of confirmed cases exceeded 190,000 resulting with over 55,000 hospitalizations with nearly 20,000 confirmed deaths.[2]

New York City has an estimate of 150,000 survivors with many of them still experiencing persisting symptoms following COVID-19. H+H/Metropolitan is a community hospital in East Harlem. We attended more than 500 patients with COVID-19 infections. Many publications have reported the symptoms related to acute COVID-19 but very few report disease sequalae.[3]Accordingly, the aim of our study was to explore the clinical status of patients who had been discharged from the hospital in the early days of the pandemic.

Objective

To identify the post discharge symptoms amongst adult patients discharged from the hospital after having been hospitalized and treated for COVID-19 from March to the end of May of 2020.

Methods

Adult patients discharged from the hospital after admission for COVID-19 infection were contacted via a telephone encounter as a post-discharge follow-up, which ranged from 9 to 92 days with an average of 57 days post discharge. A verbal consent to conduct a telephone follow up was obtained from the patients as part of standard care. A standardized questionnaire created by the study team based on available literature (Table 1) was used during post discharge telephone encounter to assess presence or absence of symptoms following discharge. Patients were also asked if they have had repeat testing forSARS-CoV-2 virus or antibodies and its results. All responses during the telephone post discharge follow up were recorded in the electronic medical record. Data collected were encrypted and kept in a secured computer to which only the investigators had access and not shared via online server.

The difference between the p-values in Table 2 were calculated

using a Fisher's exact test for age (because some of the cells had very few observations) and a Chi-Square test for sex in order to determine if there was any association between these demographics and whether or not patients were still symptomatic.

Chi-square and Fisher's Exact tests were used to determine if any unadjusted association was detected between the categorical predictors and the categorical outcome: the status of a patient being symptomatic or not (fisher's exact is used when there is a low cell count for at least one of the cells, like how there were only 4 people aged 18-34 who were still symptomatic. Otherwise, chi-square test is used to see if there is an association between categorical variables), and the multivariable logistic regression was used to calculated any adjusted associations between the predictors and the symptomatic status.A multivariable logistic regression model was used to determine any association between the predictors and the outcome of still being symptomatic versus having improved symptoms at follow-up date. Firth's logistic regression was applied to the analysis in order to handle sample bias as well as low cell counts. It is important to use the Chi-square and Fisher's exact tests to analyze unadjusted associations, but also to follow up with a statistical test that adjusts for other conditions, which is what the multivariable logistic regression model does. It also allows you to compare the odds ratios of the different categories to the reference group.

Results

Out of the 337 patients who were discharged from the hospital after having been attended for COVID-19, 180 had successful post discharge telephone encounters, 157 were unreachable, including 15 for whom contact numbers were not available.

The majority of the patients was male, 108 (60%) and belonged to the age group, 35-64 years. Out of 180 patients, 151 (83.88%) were asymptomatic and 29 (16.11%) were still symptomatic. Of the 29 symptomatic patients, the most common symptoms reported were persistent fever, 19 (65.52%), shortness of breath, 19 (65.52%) and cough, 25 (86.21%) (Table2).

The most common co morbidities were hypertension, 73 (40.56or other covariates, patients at least 75 years of age had 8.72 times the odds of still being sy%), diabetes mellitus (DM), 54 (30%) and hyperlipidemia, 35 (19.44%) (Table3). Adjusting f mptomatic at follow-up compared to those 18-44 years of age (OR = 8.72, 95% CI = 1.42, 53.29). Patients with DM had 71% lower odds of being symptomatic at follow-up than non-diabetics, after controlling for other covariates. After accounting for other covariates, patients with benign prostatic hyperplasia (BPH) were found to have 5.96 times the odds of being symptomatic at the time of the post-discharge call compared to those without BPH. There was an association between hypothyroidism and SARS-CoV-2 virus infection, though not significant once adjusted with other factors and/or predictors (Table 4).

Discussion

The majority of patients discharged from the hospital where they had been attended for COVID-19 were asymptomatic post discharge. Our study identified a group of 29 (16.11%) patients out of 180, who remained symptomatic after having been hospitalized for COVID-19. The most commonly reported symptoms were sensation of fever, shortness of breath, and cough. These findings were consistent with the currently available published data regarding common presentation of acute COVID-19.

Table 1 Standard questionnaire

Age:_____   Sex:_____
Co morbidities:_____
Date of admission:_____
Date of discharge:_____
Discharge Diagnosis/es:_____
Date of onset of symptoms prior to admission:_____
Treatment received while admitted:_____
Date of Last CT scan/x-ray and findings:_____
On oxygen on discharge: Yes_____ ; if Yes, Oxygen requirement; _____ No:_____

Do you still have any symptoms post discharge?
  A. If yes, please tell me the symptomsthat you experience _____

        A1. When did the symptoms start post discharge? Or are they continuation of the symptoms that you had while admitted?
        A2. Are the symptoms worsening? _____
  B. If no, did your symptoms resolve prior to discharge from the hospital? Or how many days post discharge did the symptoms resolve?
Did you have a repeat COVID-19 post hospital discharge with nasopharyngeal swab or saliva PCR? If yes, what are the results?
Were you tested for the presence of antibodies against COVID-19 after hospital discharge? If yes, what were the results?

Available data on thyroid involvement by coronavirus is scarce.[4] There is no reported information regarding thyroid disease and a high risk for COVID-19 association that patients with thyroid disease are at greater risk of getting COVID-19 or of being more severely affected[5] It is interesting to note that there was an association between hypothyroidism and COVID 19 infection in our unadjusted data in which the individuals affected in our study were mostly males. However, hypothyroidism affects women predominantly and therefore this association between gender, COVID infection, and thyroid status warrant further investigation.

Persistence of symptoms was prevalent in patients with BPH. This result may be partially attributed to aforementioned predominance of male subjects and small study group. However, correlation between high prevalence of 5-alpha-reductase inhibitor in BPH treatment and its potential negative influence on recovery after COVID-19 infection[6] has been reported. Amongpatients with BPH and persistent symptoms, all patients were aged above 40 years old. Upon admission baseline was assessed and compared to the symptoms after being discharged, it is difficult to establish if the persistence of symptoms like shortness of breath, cough, etc. were attributed to worsening of the underlying conditions cause by the acute illness or by the direct impact and damage of acute viral disease.

Table 2 Demographic Characteristics of Patients who Tested Positive with COVID-19 sum at Metropolitan Hospital, n=180

Demographics				
Measures	**Total, N=180** **N (%) or Median (IQR)**	**Still Symptomatic at Follow-Up, N=29 N (%) or Median (IQR)**	**Symptoms Improved at Follow-Up, N=151 N (%) or Median (IQR)**	**p-value**
Age				0.291
18-34	28 (15.56)	4 (13.79)	24 (15.89)	
35-44	39 (21.67)	3 (10.34)	36 (23.84)	
45-54	38 (21.11)	8 (27.59)	30 (19.87)	
55-64	44 (24.44)	7 (24.14)	37 (24.50)	
65-74	20 (11.11)	3 (10.34)	17 (11.26)	
≥75	11 (6.11)	4 (13.79)	7 (4.64)	
Sex				0.562
Male	108 (60.00)	16 (55.17)	92 (60.93)	
Female	72 (40.00)	13 (44.83)	59 (39.07)	
Symptoms				
Measures	**Total, N=180 N (%) or Median (IQR)**	**Still Symptomatic at Follow-Up, N=29 N (%) or Median (IQR)**	**Symptoms Improved at Follow-Up, N=151 N (%) or Median (IQR)**	**p-value**
Fever	111 (61.67)	19 (65.52)	92 (60.93)	0.641
Shortness of Breath	115 (63.89)	19 (65.52)	96 (63.58)	0.842
Cough	130 (72.22)	25 (86.21)	105 (69.54)	0.066
Chest Pain/Pressure	15 (8.33)	3 (10.34)	12 (7.95)	0.713
Diarrhea	10 (5.56)	2 (6.90)	8 (5.30)	0.665
Other Symptoms	23 (12.78)	3 (10.34)	20 (13.25)	1.000

Table 3 Comorbidities

Measures	**Total, N=180 N (%) or Median (IQR)**	**Still Symptomatic at Follow-Up, N=29 N (%) or Median (IQR)**	**Symptoms Improved at Follow-Up, N=151 N (%) or Median (IQR)**	**p-value**
Hypertension	73 (40.56)	10 (34.48)	63 (41.72)	0.467
(DM) Diabetes Mellitus	54 (30.00)	5 (17.24)	49 (32.45)	0.102
Hypothyroidism	9 (5.00)	4 (13.79)	5 (3.31)	0.018*
CKD (Chronic Kidney Disease)	11 (6.11)	2 (6.90)	9 (5.96)	0.847
End Stage Renal Disease	10 (5.56)	1 (3.45)	9 (5.96)	0.589
Hyperlipidemia	35 (19.44)	5 (17.24)	30 (19.87)	0.743
Anemia	17 (9.44)	1 (3.45)	16 (10.60)	0.315
CHF (Congestive Heart Failure)	9 (5.00)	1 (3.45)	8 (5.30)	1.000
CAD (Coronary Artery Disease)	6 (3.33)	1 (3.45)	5 (3.31)	1.000
Asthma	13 (7.22)	3 (10.34)	10 (6.62)	0.443
Obesity	18 (10.00)	3 (10.34)	15 (9.93)	1.000
Anxiety	4 (2.22)	2 (6.90)	2 (1.32)	0.122
DVT (Deep Vein Thrombosis)	4 (2.22)	1 (3.45)	3 (1.99)	0.508
BPH (Benign Prostatic Hyperplasia)	8 (4.44)	3 (10.34)	5 (3.31)	0.120

Table 4 Multivariable Logistic Regression: Risk Factors Associated with Symptom Status (Firth's Logistic Regression)

	UnAdjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age, in years				
18 to 34	1 (ref)		1 (ref)	
35 to 44	0.50 (0.10, 2.44)	0.391	0.57 (0.13, 2.60)	0.471
45 to 54	1.60 (0.43, 5.96)	0.484	1.40 (0.36, 5.39)	0.625
55 to 64	1.14 (0.30, 4.30)	0.852	1.13 (0.28, 4.52)	0.867
65 to 74	1.06 (0.21, 5.35)	0.945	1.36 (0.27, 6.90)	0.714
≥75	3.43 (0.68, 17.35)	0.136	8.72 (1.43, 53.29)	0.019*
Sex				
Male			0.77 (0.32, 1.85)	0.554
Female	1 (ref)		1 (ref)	
Diabetes Mellitus	0.43 (0.16, 1.21)	0.109	0.28 (0.09, 0.87)	0.028*
Hypothyroidism	4.67 (1.17, 18.60)	0.029*	3.84 (0.89, 16.54)	0.071
Hypertension	0.74 (0.32, 1.69)	0.468	0.52 (0.20, 1.38)	0.189
Benign Prostatic Hyperplasia	3.36 (0.76, 14.96)	0.110	5.96 (1.12, 31.75)	0.036*

An interesting finding in our study was that patients with diabetes tended to be asymptomatic, compared to those without diabetes. This finding tends to coincide with that of Shady, et.al[7], who found that having DM did not worsen the outcome of COVID-19.

The relatively small number of participants and the lack of a control group is a limitation of this study; however, the novel findings reported here, i.e., the association between symptoms and hypothyroidism in male population, persistence of symptoms in those patients with BPH and lack of association between diabetes and chronic symptomsmerit further investigation.

The complex clinical manifestations of acute SARS-CoV-2 infection remain a focus of investigation; however, long-term sequelae of this complex disease require attention in preparation for the follow up of those who survived COVID 19 infection.

Acknowledgments

Conflicts of Interset

None.

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