Title: Assessment of a Universal Preprocedural Screening Program for COVID-19

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Word Count: 900

This is the author's manuscript of the article published in final edited form as:

Dbeibo, L., Kuebler, K., Keen, A., George, A., Kelley, K., Sadowski, J., ... & Webb, D. (2021). Assessment of a Universal Preprocedural Screening Program for COVID-19. Infection Control & Hospital Epidemiology, 1-9. https://doi.org/10.1017/ice.2021.40

Abstract

Objectives

Study objectives were to: (1) Determine the value of a COVID-19 universal preprocedural screening program; and (2) Using the results of asymptomatic positive screens, determine the safety of resuming elective procedures.

Design

This was a descriptive study detailing the process and findings from implementation of a COVID-19 universal preprocedural screening program.

Setting

An adult academic tertiary center in Indiana.

Patients

Patients were included in the analysis if they were screened 96 hours prior to or within 24 hours after undergoing a procedure in the operating room, cardiac catheterization lab, or endoscopy.

Methods

A report was generated from the electronic health record of patients undergoing procedures from a six week period of time (May 4th-June 14th, 2020). Health records for positive screens were reviewed and classified as symptomatic if they met either criteria: (1) screen performed due to presence of COVID-19 symptoms; (2) documentation of symptoms at the time of the screen. Patients with a positive screen that did not meet symptomatic criteria were classified as asymptomatic. Descriptive statistics were used to calculate frequencies and percentages for the included sample.

Results

The initial sample included 2,194 patients, comprised of 46 positive and 2,148 negative screens. Out of the 46 patients who had a positive test, 17 were asymptomatic, resulting in an asymptomatic rate of 0.79% (17/2165).

Conclusion

Findings validated the value of the program through identification of a low rate of asymptomatic positive screens and procedural team adoption and sustainment. Findings may help inform decision making of like organizations attempting to enhance safety while resuming elective procedures.

Introduction

The novel coronavirus 2019 (COVID-19) has caused a global pandemic, placing unprecedented strain on the United States (U.S.) healthcare system. In order to preserve the safety of hospital staff and patients during the pandemic, the U.S. Department of Health and Human Services and the American College of Surgeons issued a guidance for hospitals and healthcare systems to postpone elective procedures on March 12, 2020.[2] Similar guidance followed from the U.S. Surgeon General and the U.S. Centers for Medicare and Medicaid Services, operationalized by individual states.[3,4] Decreased surgical capacity from COVID-19 has impacted healthcare economic and patient outcomes. As a frame of reference, deferred elective surgical activity in 2003 during the severe acute respiratory syndrome (SARS) pandemic resulted in an estimated $32.1 million in direct cost to hospitals in the Toronto/Greater Toronto Area[5] and uninteded consequences, such as seriously ill patients not seeking care.[6]

As states have gradually allowed elective procedures to resume in the U.S., healthcare organizations have been responsible for mitigating spread of SARS-CoV-2, the virus that causes COVID-19. In particular, while there is recognition of the importance of screening all patients with *and without* symptoms, some may question the value of universal screening given economic and operational considerations.

Study aims were to: (1) determine the value of universal preprocedural screening for a representative academic health center; and (2) using the volume of asymptomatic positive screens, determine the safety of resuming elective procedures.

Methods

This descriptive study included patients undergoing procedures in the operating room, cardiac catheterization lab, and endoscopy at a public adult academic tertiary referral center in Indiana. Patients were included in the sample if they had a COVID-19 screen performed within 96 hours of a scheduled elective procedure or within 24 hours after an emergent procedure. Patients were classified as symptomatic if they met either of the following criteria: (1) screen performed due to presence of COVID-19 symptoms[7]; (2) documentation of COVID-19 symptoms in the electronic medical record at the time of the screen. Patients with a positive screen that did not meet symptomatic criteria were classified as asymptomatic.

A preprocedural screening program was implemented on May 4, 2020, recommending screening within 96 hours of a scheduled procedure. Screening involved a real-time polymerase chain reaction (RT-PCR) test collected by oropharyngeal and nasopharyngeal swab. Patients with a positive or pending result were rescheduled, unless considered emergent. In the event of an emergent case, COVID-19 isolation precautions were implemented. Standard precautions were followed for patients with a negative screen unless the patient had symptoms and the proceduralist had concern for a false negative screen.

An infection prevention (IP) data analyst generated a report from the electronic health record for patients undergoing procedures for a six week period of time from May 4th - June 14th, 2020. An IP and a registered nurse (RN) independently conducted manual chart reviews to verify inclusion criteria, screening result, and categorize patients with positive screens as symptomatic or asymptomatic. The IP and RN then cross-verified the manual chart reviews to reach consensus, and any discrepancies were resolved by consultation with a third reviewer (an infectious disease physician). Patients meeting symptomatic criteria were excluded from the analysis. Descriptive statistics were used to calculate frequencies and percentages for the included sample of patients.

Results

The initial sample included 2,194 patients, comprised of 46 positive and 2,148 negative screens. Of the 46 positive screens, 29 patients met symptomatic criteria, and were excluded from the sample, leaving a final sample of 2,165 patients. The remaining 17 patients were verified as asymptomatic positive screens, resulting in a rate of 0.79% (17/2165). Trauma service patients had the highest positive incidence at 23.5%. Demographic data for the 2,165 patients included in the final sample are provided in Table 1.

Discussion

Our study showed a low prevalence of positive asymptomatic COVID-19 screens (0.79%), a rate similar to a preprocedural screening program in the state of Washington (0.8%)[8] and substantially lower than the 5-80% range reported in an international review.[9] However, it is worth noting that Indiana was on a downward trend with COVID-19 incidence, decreasing from 15% to 8.1% during the time of the study.[10] Despite low incidence of asymptomatic positive cases, our organization continued the preprocedural screening program due to informal feedback indicating proceduralist buy-in, enhanced sense of safety, and improved throughput. While universal COVID-19 screening might be ideal, this approach may have unintended consequences. For organizations with high surgical volumes, universal screening may increase costs, cause scheduling challenges, and likely put additional strain on testing resources for the hospital. Organizations should thus consider whether universal screening will produce high enough yield to offset economic and logistical consequences.

This study had limitations concerning generalizability and data analysis. It was conducted at an academic health center in Indiana, limiting generalizability to other settings and states with higher incidence. For example, when this study was conducted, Indiana was on the lower end of case rate per 100,000 (1,611) compared to states with higher rates such as Louisiana (3,431) and Florida (3,114).[1] In addition, the data analysis focus was descriptive, thus limiting conclusions about relationships or causality, or the effects of this program on healthcare worker safety.

Our study validated the value of the preprocedural screening program in allowing the resumption of elective surgical procedures. It was further strengthened through procedural team adoption and sustainment. Findings may help inform decision making of like organizations attempting to enhance safety while resuming elective procedures.

Acknowledgments

Financial support. There was no financial support provided for this study.

Potential Conflict of interest. All authors report no conflicts of interest relevant to this article.

Manuscript preparation. Stacie Marsh (Words for Good) provided writing consultation and editing services.

Acknowledgment: Authors would like to thank Nikki Walke, Administrative Director for Perioperative Services, for her contribution to the conception of the preprocedural screening program and support with implementation.

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Table 1: Sample Demographics

Characteristics	**Asymptomatic Positive** Number (%)	**Negative** Number (%)	**Total** Number (%)
Total	17 (0.79)	2148 (99.21%)	2165
Age			
<18		20 (0.93)	20 (0.92)
18-44	11(64.71)	587 (27.33)	598 (27.62)
45-64	5 (29.41)	842 (39.20)	847 (39.12)
65-74	1 (5.88)	438 (20.39)	439 (20.28)
75+		261 (12.15)	261 (12.06)
Gender			
Male	9 (52.94)	1089 (50.70)	1098 (50.72)
Female	8 (47.06)	1059 (49.30)	1067 (49.28)
Race/Ethnicity			
Hispanic	2 (11.76)	70 (3.26)	72 (3.33)
Non-Hispanic (NH) White	6 (35.29)	1664 (77.47)	1670 (77.14)
NH Black/African American	9 (52.94)	328 (15.27)	337 (15.57)
NH American Indian/Alaska Native		1 (0.05)	1 (0.05)
NH Asian		23 (1.07)	23 (1.06)
NH Native Hawaiian/other Pacific Island		1 (0.05)	1 (0.05)
Not Specified		61 (2.84)	61 (2.82)
Service Line			
Anesthesia	1 (5.88)	4 (0.19)	5 (0.23)
Cardiology	3 (17.56)	18 (0.84)	21 (0.97)
Cardiovascular	1 (5.88)	61 (2.84)	62 (2.86)
Ear, Nose and Throat		103 (4.80)	103 (4.76)
Gastroenterology	2 (11.76)	294 (13.69)	296 (13.67)
Neurosurgery	1 (5.88)	125 (5.82)	126 (5.82)
Obstetrics & Gynecology	2 (11.76)	148 (6.89)	150 (6.93)
Ophthalmology		2 (0.09)	2 (0.09)
Oral Maxillofacial Surgery & Dentistry		23 (1.07)	23 (1.06)
Orthopedics	2 (11.76)	281 (13.08)	283 (13.07)
Peripheral Vascular		74 (3.45)	74 (3.42)
Plastic Surgery	2 (11.76)	38 (1.77)	40 (1.85)
Podiatry		5 (0.23)	5 (0.23)
Pulmonology Critical Care Medicine		86 (4.00)	86 (3.97)
Radiology	2 (11.76)	176 (8.19)	178 (8.22)
General Surgery	1 (5.88)	340 (15.83)	341 (15.75)
Thoracic		41 (1.91)	41 (1.89)
Transplant		78 (3.63)	78 (3.60)
Urology		251 (11.69)	251 (11.59)