THE IMPLICATIONS ON THE RATE OF HOSPITAL ADMISSIONS AND FINANCIAL OUTCOMES IN PATIENTS WITH ACUTE CHOLECYSTITIS DURING COVID-19 PANDEMIC

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Abstract

Introduction: This study aims to investigate the implications of the Covid-19 pandemic on the number of acute cholecystitis (AC) cases and the financial burden imposed on patients due to rising healthcare costs in the USA. We hypothesize that the average number of patients admitted for AC will be decreased.

Method: ICD10 codes were used to identify patients diagnosed with acute cholecystitis at Maury Regional Medical Center from 2019-2021. The average length of stay (ALOS) and hospital costs for these patients were compared. Differences in these parameters were determined using linear regression analysis.

Results: As compared to total inpatient admissions, the percentages of AC cases in 2019, 2020, and 2021 were 0.21%, 0.29%, and 0.30%, respectively, and the average length of stay was 2.68, 2.95, and 3.66 days, respectively. The direct cost per case ranged from $4,900 to $6,100. This data suggests a slight increase in each parameter over time. Linear regression analysis confirms these results, revealing a progressive increase in the number of AC cases, ALOS, and direct cost per case (R^2>80%). While the slopes of these regression lines are significantly different (P<0.01), the lines themselves do not deviate significantly from zero.

Conclusions: The ALOS and direct cost per case increased at a greater rate than the number of AC cases during 2019-2021. However, this observation is dubious since the slopes of the regression lines did not deviate from zero. It may be possible to achieve a more robust change if the time period was expanded.

Introduction

- The World Health Organization declared Covid-19 a global emergency in January 2020, after the first cases were reported in Wuhan, China, in December 2019.
- The pandemic impacted various industries and communities, both nationally and internationally, consequently disrupting the global supply chain, particularly in the healthcare industry.[1]
- Shortages of vital personal protective equipment (PPE) increased the viral spread and exacerbated the pandemic.
- Healthcare utilization by citizens across the world was also impacted.[2] The reason for this may be multifactorial, from the fear of infection or lack of healthcare access due to quarantine.
- Many hospitals elected to cancel outpatient visits, elective surgeries and procedures in order to allocate resources such as PPE and healthcare staff for critically ill patients with Covid-19 pneumonia in the ICU.[1]
- In conjunction with the impact on healthcare, the pandemic negatively influenced the country's GDP as many communities lost their employment, further augmenting the financial burden on various communities.[1]
- For these reasons, the aim of this study is to investigate the implications of the Covid-19 pandemic on the number of Acute Cholecystitis (AC) cases at Maury Regional Medical Center (MRMC) and the financial burden imposed on patients due to rising healthcare costs in the USA.

Methods

- MRMC, ICD10 codes were used to identify patients diagnosed with AC from 2019-2021
- Data obtained from patients diagnosed with AC included…..
  - -number of AC cases vs total inpatient cases
  - -number of AC days vs total inpatient days
  - -ALOS for AC patients vs ALOS for all inpatient admissions
  - -total direct cost for AC patients vs total direct costs for all inpatient admissions
  - -direct cost per AC cases vs direct cost per all inpatient admissions
- Linear regression analysis from 2019-2021was performed for all data collected

Results

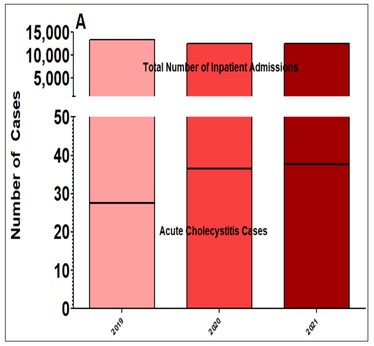


Figure 1: Number of AC cases compared to total inpatient cases

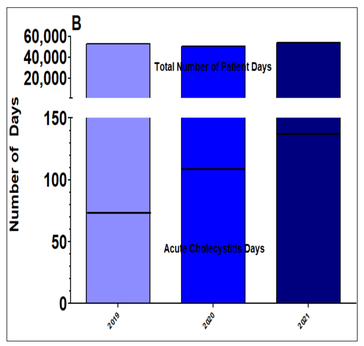


Figure 2: Number of AC days compared to total inpatient days

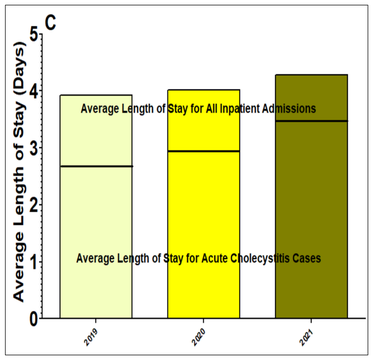


Figure 3: ALOS for AC patients compared to ALOS for all inpatient admissions

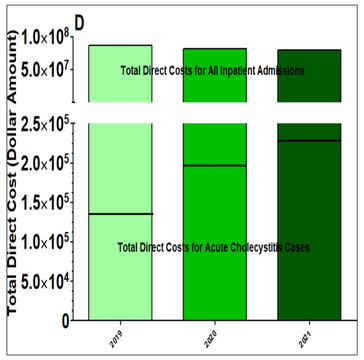


Figure 4: Total direct cost for AC patients compared to total direct costs for all inpatient admissions

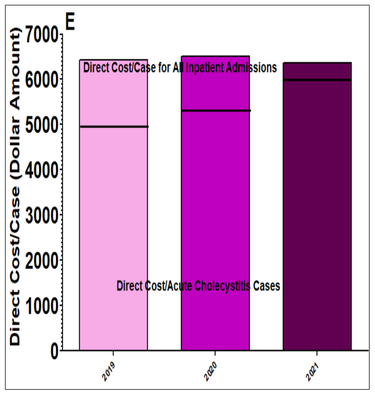


Figure 5: Direct cost per AC cases compared to direct cost per all inpatient admissions

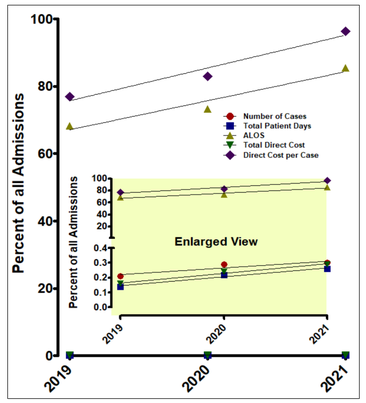


Figure 6: Linear regression analysis from 2019-2021for all data collected as a percent of all inpatient admissions

Discussion

- Compared to total inpatient admissions, the percentages of AC cases, the average length of stay (ALOS), and direct cost per case showed a slight but trending increase from 2019-2021.
- These graphs also show that the ALOS and direct cost per case increased at a greater rate than the number of AC cases during the same time frame.
- Linear regression analysis confirms these results (R^2 > 80%).
- The slopes of these regression lines are significantly different (P <0.01) from each other, but the lines themselves do not deviate significantly from zero.
- A cross-sectional study conducted by Whaley et al. [3] reported a dramatic decrease in the use of healthcare services and procedures. For example, the use of colonoscopy in March and April 2020 decreased by 69.6% when compared to the rates in March and April 2019.
- Furthermore, the use of elective musculoskeletal surgery services decreased by 28.9% in March 2020 and 66.0% in April 2020.[3]
- Limitations of this study include the short timeframe from which the data was collected and the possible presence of other complicating factors, such as the psychosocial impact (perceived or otherwise), on these patients during this timeframe[1].
- Future studies need to be conducted over an expanded time period with a more in-depth analysis of these complicating factors.

Conclusions

The ALOS and direct cost per case increased at a greater rate than the number of AC cases during 2019-2021. However, this observation is dubious since the slopes of the regression lines did not deviate from zero. It might be possible to achieve a more robust change if the time period was expanded.

References

1. Kaye, A.D., Pham, A.D., Silva, R.A., Hurley, J.J., Arron, B.L., Sarfraz, N., Lee, H.N., Ghali, G.E., Gamble, J.W., Liu, H., Urman, R.D., Cornett, E.M. Economic impact of COVID-19 pandemic on healthcare facilities and systems: International perspectives. *Best Practice & Research Clinical Anesthesiology*, 35(2021), 293-306.
2. Moynihan, R., Sanders, S., Michaleff, Z.A., Scott, A.M., Clark, J., To, E.J., Jones, M., Kitchener, E., Fox, M., Johansson, M., Lang, E., Duggan, A., Scott, I., Albarqouni, L. Impact of COVID-19 pandemic on utilization of healthcare services: a systematic review. *BMJ Open 2021*, 11, e045343.
3. Whaley, C.M., Pera, M.F., Cantor, J., Chang, J., Velasco, J., Hagg, H.K., Sood, N., Bravata, D.M. Changes in health services use among commercially insured US populations during the COVID-19 pandemic. JAMA Network Open 2020, 3(11), e2024984.

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