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Contents

Chronic Post-Surgical Pain after Cardiac Surgery: A Single-Center Prospective Cohort Study

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Introduction:
Chronic pain after cardiac surgery remains a highly prevalent complication and is associated with impaired function, delayed rehabilitation, and reduced quality of life.[1] Chronic postsurgical pain (CPSP) is notoriously refractory to multimodal analgesia techniques and carries substantial emotional, social, and economical costs secondary to heavy use of healthcare and social support resources as well as indirect costs from lost productivity.[2] To date, there have been a limited number of prospective studies on persistent pain after cardiac surgery and many aspects of CPSP have not been adequately characterized. The objectives of the present prospective study were to (1) assess the prevalence and characteristics of CPSP at 3, 6, and 12 months after cardiac surgery in a large prospective cohort of Canadian patients; (2) determine the proportion of patients with CPSP whose pain was likely neuropathic in nature; and (3) identify demographic, clinical, surgical, and psychological risk factors for CPSP.

Methods:
This is a prospective cohort study of adult patients who underwent non-emergent open-heart surgery via median sternotomy incision between 2011-2015. Eligible surgical procedures included coronary artery bypass surgery, valve replacement or repair, aneurysm repair, heart transplant, and insertion of a ventricular assist device. Prior to surgery, participants completed a questionnaire packet that assessed demographic variables and preoperative pain history. In addition, standardized instruments were used to assess psychological wellbeing including the Hospital Anxiety and Depression Scale (HADS), Pain Catastrophizing Scale (PCS), and the McGill Pain Questionnaire-Short-Form-2 (SF-MPQ-2). Clinical and surgical variables were extracted via chart review. The intensity of acute postoperative pain and cumulative opioid use on each day for the first five postoperative days was also measured. Patients were followed up at 3, 6, and 12-months postoperatively and CPSP around the surgical incision site was assessed as non-zero pain on a 0-10 numeric rating scale. Detailed pain characteristics were collected, including pain frequency, location, and presence of paresthesia. The Leeds Assessment of Neuropathic Signs and Symptoms Pain Questionnaire (LANSS) was utilized to identify participants with likely neuropathic pain using a cut point of ≥12.[3] Multivariate logistic regression was performed to identify risk factors of CPSP.

Results:
The sample (n=1,059) was predominantly male (76.7%), with a mean (SD) age of 58.9 (13.9) years. The prevalence of CPSP at 3, 6, and 12-months was 28.8%, 18.9%, and 14.7%, respectively. At 3- months, CPSP was on average mild-to-moderate in intensity with 63.4% of respondents localizing their pain deep to the surgical

incision (muscle or joint). The majority of participants experienced pain episodes once a week (43.5%) or once an hour (39.8%), with each episode lasting seconds to minutes (64.9%). 33.7% of participants had neuropathic pain at 3-months which subsequently increased to 39.2% and 64.2% at 6 and 12-months, respectively. Participants with neuropathic pain reported higher pain intensity. Independent predictors of CPSP across all time points included female sex, age ≤ 60 years, preoperative anxiety, baseline chronic pain, high postoperative pain intensity, and higher opioid use within 5 days of surgery (area under the curve 0.75-0.81).

Discussion:

Our results indicate that nearly one in three patients undergoing cardiac surgery developed CPSP at 3 months, with ~15% reporting persistent pain at 1 year. Potentially modifiable risk factors for CPSP included preoperative anxiety, preexisting chronic pain, acute postoperative pain, and higher cumulative opioid consumption in the immediate postoperative period.[4] Transitional pain services that focus on multimodal preventative strategies (e.g. cognitive-behavioral interventions and pain medication optimization) may lead to improved long-term pain outcomes in patients who are at high risk of developing CPSP and warrants further study.[5]

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Accuracy of the FRAIL Scale for Predicting Postoperative Complications in Older Surgical Patients - A Systematic Review and Meta-Analysis

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Introduction:

Frailty is associated with increased risk for postoperative complications and mortality. During the COVID-19 pandemic, preoperative assessments have shifted to virtual assessments, precluding the use of frailty tools that require in-person assessment. The FRAIL scale [1] is a brief assessment that can be conducted virtually, but its ability to predict postoperative outcomes in older surgical patients is unknown. Despite recommendations from medical societies that frailty be assessed routinely before surgery [2][3], frailty assessment may not be performed due to barriers including a lack of time in busy preoperative clinics, length of time it takes to administer assessments, and reliance on an administrator for assessments.
It is the objective of this systematic review and meta-analysis (SRMA) to determine whether the FRAIL scale predicts mortality and postoperative outcomes in older surgical patients, and whether it is comparable with validated frailty assessments.

Methods:

Medline, Medline ePubs/In-process citations, Embase, APA PsycInfo, Ovid Emcare Nursing, (all via the Ovid platform); Cumulative Index to Nursing & Allied Health Literature (CINAHL) EbscoHost; the Web of Science (Clarivate Analytics), and Scopus (Elsevier) were searched from 2008 to Dec 17th, 2021 to identify English language studies using the FRAIL scale in surgical patients and reporting postoperative outcomes, mortality and postoperative complications. Studies were included if participants in the study underwent any surgical procedures, elective or emergency. Studies were included if they reported one or more of the outcomes of interest (mortality, length of stay (LOS), functional recovery, delirium, or postoperative complications). Studies were excluded if they were case reports, reviews, qualitative studies, abstracts, protocols, or were not published in English. No restrictions were placed on the use of a comparator, if any. We included randomized controlled trials, quasi-experimental studies (non-randomized controlled trials), and observational studies (prospective and retrospective). The risk of bias was assessed using the quality in prognosis studies tool. All citations were de-duplicated, screened, extracted, and assessed for quality in duplicate using Covidence. A standardized form was used for data extraction of the included studies as well as quality assessment.

Results:

A total of 18 studies with 4,479 participants were included. Mortality was assessed in seven studies, with five studies reporting 30-day mortality OR: 6.28 [95% CI: 2.15. 18.30, $p<0.01$, $I^2=59.3\%$], three studies reporting mortality at 6 months OR 2.97 [95% CI: 1.54, 5.72, $p<0.01$, $I^2=20\%$], and three studies reporting 1-year

mortality OR:1.54 [95% CI: 0.91, 2.58, p=0.11, I^2=0%]. Postoperative complications were reported in five studies, with all studies indicating greater risk of postoperative major complications for frail patients OR:2.99 [95% CI: 1.99, 4.49, p<0.01, I^2 =28.7%]. Four studies showed frail patients had a greater likelihood to develop postoperative delirium OR: 2.65 [95% CI: 1.85, 3.80, p<0.01, I^2=0%] and 1 study found cognitive recovery to be inversely correlated with frailty. The FRAIL scale and clinical frailty scale (CFS) were comparable OR: 1.04 [95% CI: 0.939, 1.16, p=0.42] for classifying frail patients. The risk of bias was low in 16 studies, and moderate in two.

Discussion:

Our SRMA shows that frailty assessed with the FRAIL scale was associated with increased odds of mortality at 30-day, 6-months, postoperative complications, and postoperative delirium. The FRAIL scale may be an acceptable alternative to in-person frailty assessments. Further studies are needed to determine whether frailty as assessed by the FRAIL scale is a feasible instrument for assessing frailty through telehealth or virtual assessments in surgical patients.

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An International Multicenter Observational Study of Patient and Process Outcomes among 3302 Pediatric Patients Undergoing Appendectomy During the COVID-19 Pandemic

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Introduction:

COVID-19 has forced healthcare systems to make unprecedented changes in clinical care processes. Despite the lower COVID-19 burden among pediatric patients, the global ramp-down of elective surgical cases and implementation of preoperative testing included many pediatric centers. We hypothesized that the COVID-19 pandemic has adversely impacted timely access to care, perioperative processes, and clinical outcomes for pediatric patients undergoing primary appendectomy during the pandemic (2020) compared to a matched pre-pandemic period (2019).

Methods:

We conducted a retrospective, observational, international, multicenter study using matched cohorts within participating centers of the international *PE*diatric *A*nesthesia *CO*VID-19 *C*ollaborative (PEACOC). We included patients <18 years of age undergoing primary appendectomy. Study definitions for metrics and outcomes including Hospital Length of Stay (HLOS), time to appendectomy (time-to-intervention), time from OR entrance to intubation: total operative time: total anesthesia time, PACU length of stay. Comparisons of all patient characteristics between April-May 2019 versus April-May 2020 were performed using absolute standardized mean difference (SMD) as a measure of balance between the two comparison groups. SMD values less than 0.10 were considered as reflecting good balance between the two groups on a given variable. Since good balance was determined for all baseline confounding factors between the two arms based on the SMD, all data were included in the analyses of outcomes. For continuous outcomes, including the primary outcome of HLOS, data were summarized as medians and interquartile ranges due to departure from normality as determined by the Shapiro-Wilk test. Statistical comparisons were performed using mixed-effects median regression modeling with a random-effect for the two matched cohorts. Binary outcomes were expressed as frequencies and percentages, and conditional logistic regression was implemented with the matched set incorporated as a random effect in the model.

Results:

The study included 3302 patients from 28 centers: 1684 patients in the pre-pandemic cohort and 1618 in the pandemic cohort. Hospital length of stay (HLOS) was 29 hours in the pandemic cohort versus 28 hours in the pre-pandemic cohort (adjusted coefficient, 1; 95% confidence interval [CI] 0.39 to 1.61, P<0.001). (Figure 1A-F). Total operative time, total anesthesia time, and PACU length of stay changed from the pre-pandemic to the pandemic period across individual institutions and geographical regions. During the pandemic period, there was an increase in patients with complicated appendicitis (adjusted odds ratio, 1.32; [95% CI 1.1 to 1.59]; *P*=0.003) and severe postoperative pain (adjusted odds ratio, 1.36; [95% CI 1.10 to 1.68]; *P*=0.004). Preoperative COVID-19 testing was associated with significantly longer time-to-appendectomy and longer HLOS.

Discussion:

For children undergoing appendectomy, the impact of the pandemic on pediatric perioperative care in a large, multicenter, international cohort study observed that children undergoing emergent primary appendectomy during the COVID-19 pandemic had slightly prolonged hospital length of stay, delayed access to care, and worse outcomes compared to a matched cohort from the previous year. The impact of SARS-CoV-2 testing, especially among those testing positive/PUI, was universal and requires consideration during the ongoing COVID-19 pandemic and future pandemics.

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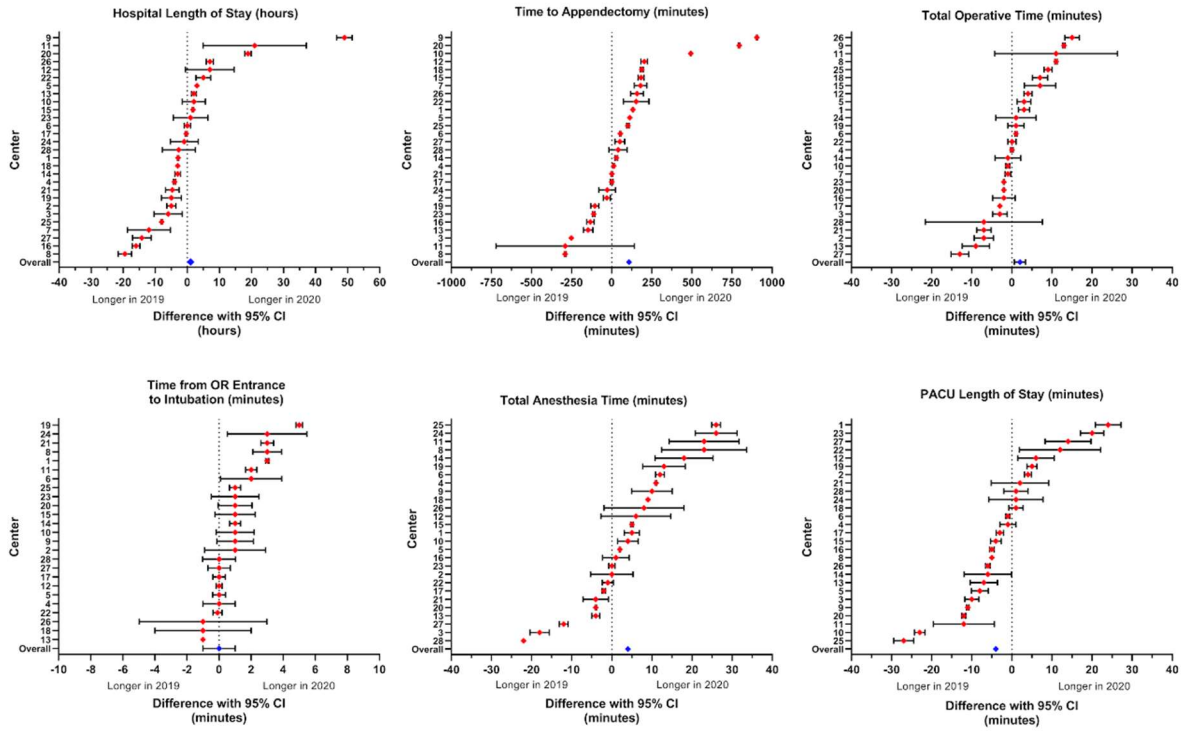
Figure 1:



Pan-Canadian Survey of Vulnerable Anesthesiologists and Trainees Shielding during the COVID-19 Pandemic

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Introduction:
COVID-19 continues to be a challenge stressing health system capacity and requiring extraordinary organizational-level planning. Health care workers (HCW) are particularly at risk of viral transmission that can occur through aerosol and droplet transmission.[1] Many HCW identify themselves as "clinically vulnerable"; meaning they are at risk of more severe COVID-19-related adverse outcomes due to pre-existing medical conditions including advanced age; and other chronic medical conditions (e.g. heart disease, cancer).[2] According to data published by Canadian Institute for Health Information: HCW who make 8% of labour workforce in Canada, represent 19% of COVID cases.[3] However, there is no data from the Canadian physician workforce regarding how clinically vulnerable physicians have responded and modified their practice during the pandemic. This study was designed to describe the lived experiences of anesthesiologists and trainees who identify themselves as clinically vulnerable in response to COVID-19 and how they modified their practice in Canadian healthcare settings.

Methods:
We conducted a nation-wide survey to assess shielding practices of members of Canadian Anesthesiologists' Society in Canada. Data was collected in the form of a survey with multiple choice and open-ended questions. The survey design was informed using the Canadian Medical Association's National Physician Health Survey[4] and the United Kingdom's National Survey of Shielding Doctors[5] to address participants' general demographics, clinical vulnerability and its impact on their career, organizational and departmental support, as well as their mental health and coping response. The Canadian Anesthesiologists' Society (CAS) mailed out the survey to Canadian Anesthesiologists and trainees on October 26, 2021. A modified Dillman approach was used to remind and encourage participation over the period of two months. First reminder email was sent on November 16th and second reminder on December 15th. We included respondents who self-identified as clinically vulnerable in response to COVID-19 pandemic. Survey responses were summarized using descriptive statistics.

Results:

A total of 125 participants, out of 2194 CAS members responded to the survey, of whom 78 (3.3%) were deemed eligible. Median age was 64 (range, 31-74), 29.5% female, median years of practice 30 (range, 1-44). The majority (97%) were physicians in practice mainly in Ontario, BC, and Alberta. Over 50% respondents shielded for various reasons including increased age, medical conditions such as respiratory, immunosuppression, malignancy, and protecting a vulnerable family member. The vulnerable status affected their careers in various ways such as: financial reduction (49% reporting loss of pay more than 10% of salary), and early retirement. The range of feelings experienced by respondents, included but not limited to worry, fear, frustration, guilt, and isolation: "There's a lack of action in protecting vulnerable individuals, we are on our own." Seventy percent respondents had returned to work, with majority working on low risk work (non-COVID), as well as working remotely.

Discussion:

Our results are consistent with previously reported cases from The United Kingdom's National Survey of Shielding Doctors.[5] Many clinically vulnerable anesthesiologists and trainees faced unexpected disruption to careers, which created social and psychological challenges, especially for those who have been shielding. Recommendations from the Government of Canada identifying vulnerable populations were directed at the general population level, and did not specifically address the identification or protection of HCW having elevated risks. Our data shows that there is a need to address these issues and put institutional or provincial protocols in place to support clinically vulnerable physicians in Canada.

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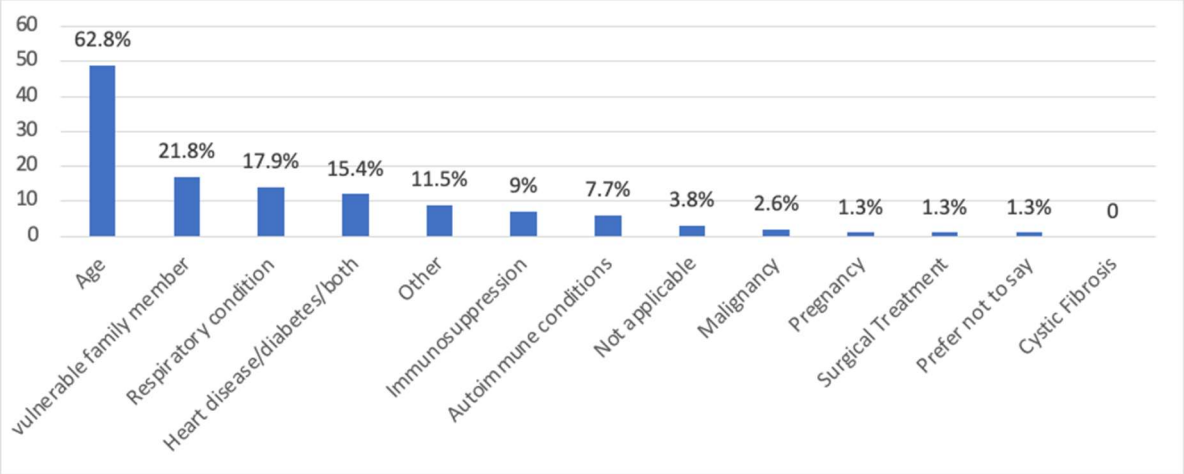
Figure 1:

Why do you identify yourself at a greater risk of COVID-19 or vulnerable? N = 78



How do you feel about being vulnerable or having a family member who is vulnerable due to the pandemic? Please check all that apply. N = 76