Journal of Critical Care 31 (2016) 119–124

Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.jccjournal.org

Finding the red flags: Swallowing difficulties after cardiac surgery in patients with prolonged intubation

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ARTICLE INFO

Keywords:
Cardiac surgery
Dysphagia
Speech-language pathology
Silent aspiration
Tracheostomy

ABSTRACT

Purpose: This retrospective audit set out to identify referral rates, swallowing characteristics, and risk factors for dysphagia and silent aspiration in at-risk patients after cardiac surgery. Dysphagia and silent aspiration are associated with poorer outcomes post cardiac surgery.
Methods: One hundred ninety patients who survived cardiac surgery and received more than 48 hours of intubation were included. Preoperative, perioperative, and postoperative information was collected.
Results: Forty-one patients (22%) were referred to speech-language pathology for a swallowing assessment. Twenty-four of these patients (13%) underwent instrumental swallowing assessment, and silent aspiration was observed in 17 (70% of patients diagnosed as having dysphagia via instrumental assessment). Multilogistic analysis revealed previous stroke ($P < .05$), postoperative stroke ($P < .001$), and tracheostomy ($P < .001$) independently associated with dysphagia. The odds ratio for being diagnosed as having pneumonia, if a patient was diagnosed as having dysphagia, was 3.3.
Conclusions: Patients identified with dysphagia after cardiac surgery had a high incidence of silent aspiration and increased risk of pneumonia. However, referral rates were low in this at-risk patient group. Early identification and ongoing assessment and appropriate management of dysphagic patients by a speech-language pathologist are strongly recommended.

1. Introduction

Dysphagia is a recognized complication of cardiac surgery, with the incidence reported to be between 3% and 67% depending on study inclusion criteria [1–5]. Reported risk factors for dysphagia after cardiac surgery are varied in agreement and include older age [2,4], congestive heart failure [2], sepsis [1,4], perioperative stroke [1], noncoronary bypass surgical procedures [2], transesophageal echocardiography [5], postoperative stroke [5], and intubation time [1,4,5]. Most recently, Skoretz and colleagues [4] conducted a large retrospective study specifically investigating the impact of intubation time on dysphagia prevalence. Prevalence of dysphagia in all patients who underwent cardiac surgery was 6%. However, when intubation time was taken into account, there was a 2-fold increase in the odds of developing dysphagia with increasing lengths of intubation time (analyzed in 12-hour increments). In patients with more than 48 hours of intubation, the prevalence of dysphagia rose to 67% [4].

Dysphagia after cardiac surgery is associated with poor prognosis [1]. Dysphagia has been observed to delay return to oral intake, triple length of hospital stay, and double hospital costs [1,2]. Patients with dysphagia after cardiac surgery have a higher incidence of pneumonia and postoperative death [6]. Silent aspiration is prevalent in patients in intensive care unit (ICU) settings. In 51 consecutive general ICU patients requiring more than 48 hours of mechanical ventilation, 27 patients aspirated and 12 patients (25%) of these silently aspirated on routine fiberoptic endoscopic evaluation of swallowing (FEES) [7]. Romero and colleagues [8] found a 38% dysphagia rate in nonneurologic patients with a tracheostomy in ICU. Seventy-three percent of those with dysphagia silently aspirated. Aspiration and particularly silent aspiration (aspirating without a protective cough response) have been linked with an increased prevalence of pneumonia in general medical populations [9,10]. In a mixed etiology study, patients with aspiration diagnosed on videofluoroscopic study of swallowing (VFSS) had a 10-fold increased risk of pneumonia, whereas those with *silent* aspiration had a 13-fold increased risk of pneumonia [10]. Newly published data describe the effect of intubation on airway responsiveness in a group of patients after coronary artery bypass graft surgery. Cough reflex testing has been suggested as an indicator of silent aspiration risk [11]. Patients received cough reflex testing prior to surgery, within 2 hours of extubation, and then periodically until their cough reflex returned to

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http://dx.doi.org/10.1016/j.jcrc.2015.10.008
0883-9441/

baseline. Sixty percent of patients after extubation presented with an absent cough reflex within the first 2 hours, indicating the increased risk of compromised airway protection in this population [12].

Much of the work in dysphagia after cardiac surgery has been conducted in North America, and findings may not equate to different medical systems and patient populations. Inconsistencies within the literature for predictors of dysphagia in this population justify further research. Although sample sizes in these larger North American studies show robust findings, crude measures of dysphagia were used such as modification of diet or bedside swallowing screens [1,4]. Further research using instrumental assessments that are sensitive to the identification of silent aspiration are needed. The aim of this retrospective study was to identify referral rates, swallowing characteristics, and risk factors associated with dysphagia after cardiac surgery in at-risk patients in a single cardiac surgical center in New Zealand.

2. Methods

A retrospective audit was performed on consecutive patients who underwent cardiac surgery at Auckland Hospital between 30th June 2012 and 28th June 2014 and who were intubated for more than 48 hours via an endotracheal tube. Patients who died before or after surgery were excluded from the study. *Dysphagia* was defined as any abnormality of swallowing as confirmed by a speech-language pathologist by bedside assessment and/or instrumental assessment (FEES or VFSS). At the time of this study, no formal screening process existed for referral to speech-language pathology. As standard practice, all patients had a nasogastric tube (NGT) inserted during surgery. When a patient was deemed appropriate to commence oral intake by their medical team, cautious oral intake was trialed with the patient's nurse. Patients were referred to speech-language pathologist by the multidisciplinary team, most commonly under circumstances of difficulty managing saliva, difficulty swallowing, coughing on intake of oral fluids, or suspected aspiration risk. A standard bedside swallowing evaluation exists at the hospital that includes clinical history, cranial nerve examination, cough reflex test, and oral trials. Frequency of instrumental assessments in individual patients was clinically driven and not controlled. This study received University of Auckland Human Participants Ethics committee and Auckland District Health Board approval (UOAHPEC011721/A+6293).

2.1. Preoperative, perioperative, and postoperative variables

The primary author collected demographic variables from the institution's cardiovascular intensive care unit's (CVICU) database. The database is collected prospectively by clinical specialist nurses. Preoperative variables such as the European System for Cardiac Operative Risk Evaluation 2 [13] and New York Heart Association [14] heart failure score were reported on all patients by specialist cardiology staff and were extracted from the database. All perioperative variables, such as surgery type, stroke, and use of transesophageal echocardiogram were also collected from the CVICU database.

Postoperative variables were collected from both the CVICU database and scanned clinical records from the patients' inpatient admission. Perioperative or postoperative stroke was confirmed by computed tomographic scan. Presence of pneumonia was established using the National Healthcare Safety Network (2005) "Criteria for Defining Nosocomial Pneumonia" [15] by the primary author. Twenty-percent of all files were second marked by the second author with 100% agreement.

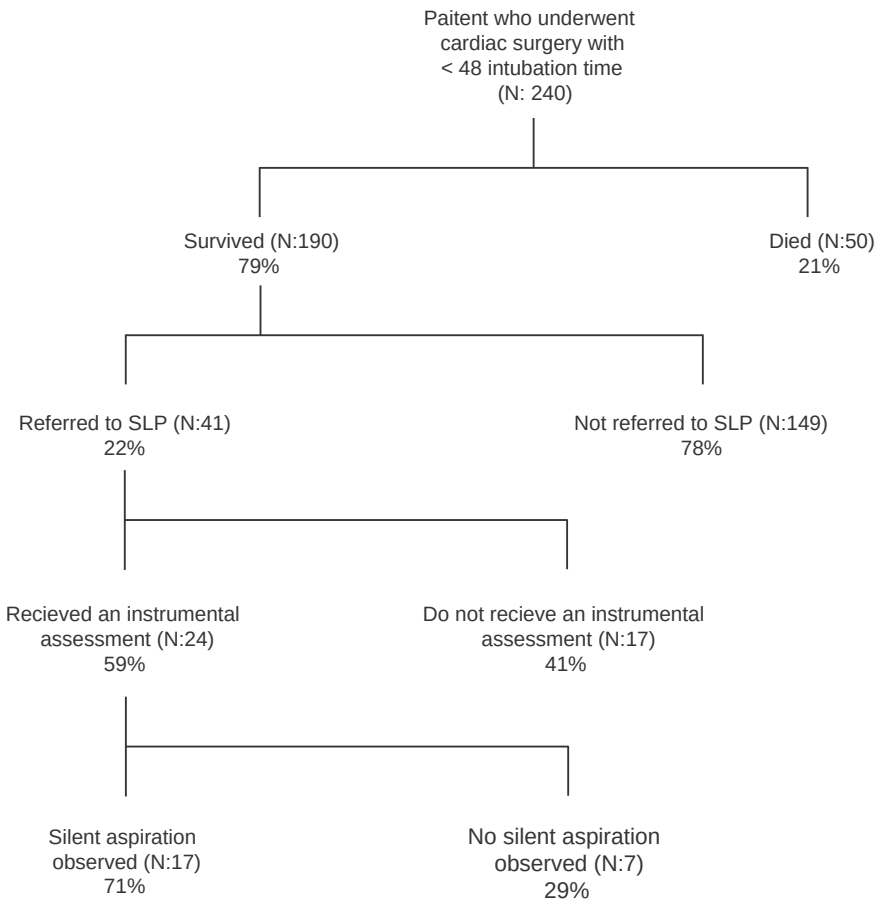

Fig. 1. Inclusion and exclusion.