Dysphagia after Cardiothoracic Surgery

Goals/Objectives

The learner will demonstrate a general knowledge of the anatomy and physiology of the heart, associated diseases, and common cardiothoracic surgeries.

> The learner will be able to complete a chart review to identify risk factors for dysphagia after cardiothoracic surgery.

> The learner will identify effective assessment and treatment strategies to implement for patients with dysphagia after cardiothoracic surgery.



Heart Valve Disease

Stenosis

 narrowing or stiffening of valve, decreases blood flow

Regurgitation

• "leaky valve", blood leaks backwards into chamber

Atresia

 valve isn't formed, tissue blocks blood flow between chambers



Heart Valve Disease

Causes:

- Age related changes
- Calcium deposits
- Infections
- Autoimmune disease
- Congenital

Symptoms:

- Fatigue
- Shortness of breath
- Chest pain/discomfort
- Lightheadedness
- Swelling of ankles/feet
- Irregular heart beat

Advanced valve disease can lead to heart failure, stroke, blood clots, or cardiac arrest

Cardiac Surgeries – Transcatheter valve replacement

•TAVR, TMVR

- •Minimally invasive procedure to treat damaged or diseased heart valves
- •Used for patients who are at intermediate to high risk for complications with open heart surgery
 - Becoming more common for patients at low-moderate risk

Not likely to require speech consult

•Benefits:

- Less invasive
- Shorter hospitalization
- Quicker recovery

Cardiac Surgeries – Surgical valve replacement

- •Open heart surgery for repair or replacement when one or more valves becomes diseased
- •Replacement is with either mechanical or biological valve





Coronary Artery Disease

- •AKA "CAD"
- •Coronary arteries supply blood to the heart
- •As we age, deposits of cholesterol and fat form in the lining of the arteries (atherosclerosis)
- •Limits blood flow and can lead to heart attack



Cardiac Surgeries - CABG

- Coronary Artery Bypass Graft Surgery
- •Open heart surgery for patients with Coronary Artery Disease (CAD) improves blood flow to the heart
- •Graft healthy veins from another part of the body, place to bypass blocked arteries to create new route for blood to flow



Aortic Aneurysm

- •Balloon-like bulge in the wall of aorta
- •Can occur in
 - Chest (thoracic aortic aneurism, TAA)
 - Abdomen (abdominal aortic aneurism, AAA)
- Most common cause is atherosclerosis
- •Can lead to dissection or rupture



Cardiac Surgeries - Aneurysm Surgery

- X X
- •Replacement of portion of the aorta with an artificial implant. The graft is sewn into place with a permanent suture material
- •Open heart surgery for TAA
- •Open abdominal surgery for AAA

Recovery after Open Heart Surgery

- •Length of stay ~5-8 days
- Emphasis on home-going
- •Typically extubated POD 1 and transfer to step down unit later that day if doing well
- •Patients are kept NPO or on zero carbohydrate clear liquid diet with an insulin drip for up to 48 hours after surgery
- May advance diet sooner than 48 hours if they aren't diabetic
- Often will have nausea post-op
- Appetite is typically poor after surgery, potentially for weeks



Stroke risk after cardiac surgery

•According to the American Heart association, risk of stroke after cardiac surgery ranges from 1-9%

Causes

- Embolism
- Post-operative a-fib

TTE vs TEE

Both used to take ultrasounds of the heart

TTE

- Transthoracic echocardiogram
- Uses transducer on chest
- More common
- Less invasive
- Less sensitive

<u>TEE</u>

- •Transesophageal echocardiogram
- •Places transducer in esophagus
- •More invasive
- •More sensitive (gets closer to heart and gives more precise images)
- •Long history of associated dysphagia

NYHA

Class	Patient Symptoms
I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation or shortness of breath.
П	Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, shortness of breath or chest pain.
Ш	Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, shortness of breath or chest pain.
IV	Symptoms of heart failure at rest. Any physical activity causes further discomfort.

Dysphagia in Cardiac Surgery Patients

left recurr

aryngeal ner

Possible etiology

- Mechanical
- Respiratory
- Deconditioning
- Impaired cognition
- Esophageal dysphagia

Myres, 2022

New research

- •Plowman, et. al 2021: Dysphagia after cardiac surgery: Prevalence, risk factors, and associated outcomes
- •First prospective study using universal instrumental swallow studies found that 94% of patients had unsafe swallowing after open heart surgery
 - Penetration to the vocal folds
 - Laryngeal vestibule residue
 - Aspiration

Plowman, et. al 2021 - Methods

- •182 participants
- •s/p elective or emergent cardiothoracic surgery via sternotomy or extended thoracotomy who were extubated and able to maintain SpO2 >90 without CPAP or BiPAP
- •Excluded patients with a history of dysphagia
- •FEES completed within 72 hours of extubation





Plowman, et. al 2021

Independent risk factors for aspiration

- NYHA III-IV
- Reoperation
- □Intraoperative TEE images >110
- \Box ETT size \geq 8
- □Intubation > 27 hours

3 factors = 16.4x increased odds for aspiration

4 factors = 22.4x increased odds for aspiration

Plowman, et. al 2021

3 oz water test only 63% sensitive to detect aspiration in cardiothoracic surgery patients





What does this look like in practice? Smartphrase: .cardiacdysphagiariskfactors Noted the following independent predictors of dysphagia/aspiration after cardiac surgery (Plowman, 2021): New York Heart Association Scores III-IV Re-operation >110 TEE images captured intraoperatively Intubation >27 hours Endotracheal tube size 8 or greater 3 of these factors present = 16.4 higher odds of aspiration 4-5 of these factors present = 22.4 higher odds of aspiration (CARDIAC DYSPHAGIA IMPRESSION:45082)

Collection: Unit		
	ent Admission	<u>^</u>
	ospital Encounter - Riverside Methodist Hospital CVI	7/23/2023
Cardiac sternal precaution	Progress Notes by Farley, Marsha Lynn, CNR : NYHA Class III ACC/AHA Stage C	8/7/2023
Other implants (5)	Progress Notes by Farley, Marsha Lynn, CNP : NYHA Class III ACC/AHA Stage C	8/6/2023
Kim, Wesley Francis, MD Attending	Progress Notes by Farley, Marsha Lynn, CNP	8/5/2023

Intraoperative TEE

DESCRIPTION OF PROCEDURE

The patient placed in the supine position on the operating room table. General endotracheal anesthesia was established and monitoring lines were placed. Patient's chest, abdomen, and extremities were prepped with chlorhexidine and draped using sterile technique. A time-out was performed. A median sternotomy was then performed. The chest was entered without difficulty. A Cosgrove retractor was utilized to facilitate exposure. Heparin was given. The ACT was greater than 400 seconds. The pericardium was opened and the heart was suspended in a cradie. The ascending aorta and right atrium were cannulated and cardiopulmonary bypass was initiated. The patient was cooled to 32 degrees. The ascending aorta was then crossclamped. Cold sanguineous cardioplegic solution was delivered into the aortic root. Prompt diastolic arrest was achieved. The left atrium was opened anterior to the right-sided pulmonary veins. The heart was drained. A 35 mm AtriClip was placed across the base of the atrial appendage.

Attention was then turned to the mitral valve. The valve was inspected. The P2 segment of the posterior leaflet was redundant with torn cords to the free edge. It was felt to be a repairable valve. The anterior leaflet was normal in appearance. Nonpledgeted 2-0 Ethibond sutures were then placed circumferentially around the anulus. Good exposure of the mitral valve was achieved. The P2 leaflet was resected. Interrupted 5-0 Prolene sutures were used to reapproximate the residual P1 and P3 segments. A 28 annuloplastly ring was then brought onto the field. Sutures were placed through the ring and it was lowered into position and secured with a Cor-Knot. Saline flush test revealed a good result. The left atriotomy was then closed. The atrium was de-aired and the cross-clamp was removed after 55 minutes. She was rewarmed, unwarded, norm contiguing the more bar was soft forst attempt. Transesophageal echo emonstrated the absence of air in the heart.

	SnapShot Chart Review History Allergies Problem List Medi	cations Health Maintenance Flowsheet
Chart R	Review	
E E	Encounters Notes Labs Imaging Cardiology Surgeries	Procedures Meds Media Letters
Preview	w ▼ 3 Befresh (12:30 PM) = Select All = Deselect All B Review S s M Hide Canceled XR Mammo US Results Only CT	Selected 📳 Side-by-Side 🔚 Synopsis 🛛 🛋 R
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M	07/07/2022 07/07/2022 1 07/07/2022 1 1000011386395	Echocardiogram intraop TEE guidance
R	07/05/2022 07/07/2022 0 07/05/2022 1 1000011373116	XR Criest AP/PA and LAT
AN Ge	NESTHESIA ieneral endotracheal/transesophageal echo.	

Intubation duration and ETT size

🗈 Summary Chart Review Results Review 💽 MAR 📧	Flowsheets No	otes Education I	Plan of Care Ord	ers IP Therapy					
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Admission (Discharged) from 7/7/2022 in Riverside Methodist Hospital CVI									
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Artificial Airway			1						
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[REMOVED] ETT 07/07/22									
ETT Properties	Removed: 7	/10/2022 1003 F	Placed: 7/7/2022 13	335 📄 🛛 Mask Ve	ntilation: Ventilate	d by mask Show all properties			
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Site Condition					Placement Date	7/7/2022			
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Safety Equipment at Bedside					Mask Ventilation	ventilated by mask			
Safety Equipment at Bedside	Resuscitation b	Resuscitation b	Resuscitation b	Resuscitation b	wask venuation	Ventilated by mask			
Back Up Trach Type					Technique	Direct laryngoscopy			
Back Up Trach Size					Type	Ouffed: Oral			
Suction					Tube Size	8 mm >			
F Suction					Insertion	1			
Airway Suctioning/Secretions					Attempts				
Suction Type					Placement	Auscultation; End tidal (CO2 detector;		
Suction Device					verification	Symmetrical chest wall	movement		
Secretion Amount					Attributes				
Secretion Color					Comment				
Secretion Consistency					L				
Suction Tolerance							Tolerated poorly 44		
Suctioning Adverse Effects							Anxiety 44		

General considerations

- •FEES vs MBS (traveling when in CVICU is difficult for RNs and patients) • Awareness of lines/tubes, etc.
- •Rapid recovery (repeat within 2-3 days potentially)
- Cognitive status typically able to follow complex commands for exercises
- •Length of stay what that means for repeat studies
- Poor appetite
- •Sternal precautions coughing (painful, have to hold chest)

Treatment techniques

- Individualized based on patient's deficits noted on instrumental swallow studies
- •Potential areas to target:
 - Frequently note decreased arytenoid adduction and weak cough
- •Consider ice chips/free water protocol for patients who are NPO or on modified liquids

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