2019 SCSHA Convention

Medications and their effects on swallowing

Kristen Cline, MA, CCC-SLP, BCS-S

Carolina Speech Pathology

Disclosures

Kristen Cline has no financial or non-financial disclosures.

Learner objectives

- Learner will be able to describe the mechanisms for how some medications cause dysphagia.
- Learner will be able to list at least 3 medication types that can influence swallowing function.
- Learner will explain how polypharmacy can increase the risk for aspiration pneumonia in the elderly population.

Dysphagia

- defined as difficulty swallowing
- prevalence may be as high as 22% in adults over age 50
- even higher (30%) in the elderly population receiving inpatient medical care
- and even higher (up to 68%) in long-term care settings

Phases of swallowing

- Anticipatory Phase
- Oral preparation/oral phase
- Pharyngeal phase
- Esophageal phase

Anticipatory phase

- Alertness
- Attention to task
- Orientation
- Visual and sensory stimulation (sight and smell of food)

Oral preparation/oral phase

- Contain the bolus in the oral cavity
- Prepare the bolus (mastication)
- Prepare bolus for transfer (collect bolus)
- Propel bolus A-P to the hypopharynx

Pharyngeal phase

- Base of tongue contact to posterior pharyngeal wall
- Velar closure
- Hyolaryngeal excursion
- Laryngeal vestibule closure to protect airway
- Pharyngeal constriction to push bolus through the pharynx
- Opening of UES

Esophageal phase

- Primary peristalsis squeezes bolus through the esophagus

- LES opens and allows bolus to enter the stomach

All phases of swallowing can be impacted by certain medications!

Ways medications influence swallowing

- Changes in cognitive function (sedation, lethargy, decreased attention to task, confusion)
- Changes in nerve & motor function
- Reduction in lubrication
- Impaired GI motility; esophageal injury

Medication groups that can influence normal swallowing

- Antipsychotics
- Anti-convulsant/anti-epileptic medications
- Pain medications
- Medications for Alzheimer’s disease
- Parkinson’s medications
- Medications that impact GI function/cause esophageal injury

The Nervous System

Central Nervous System (CNS)

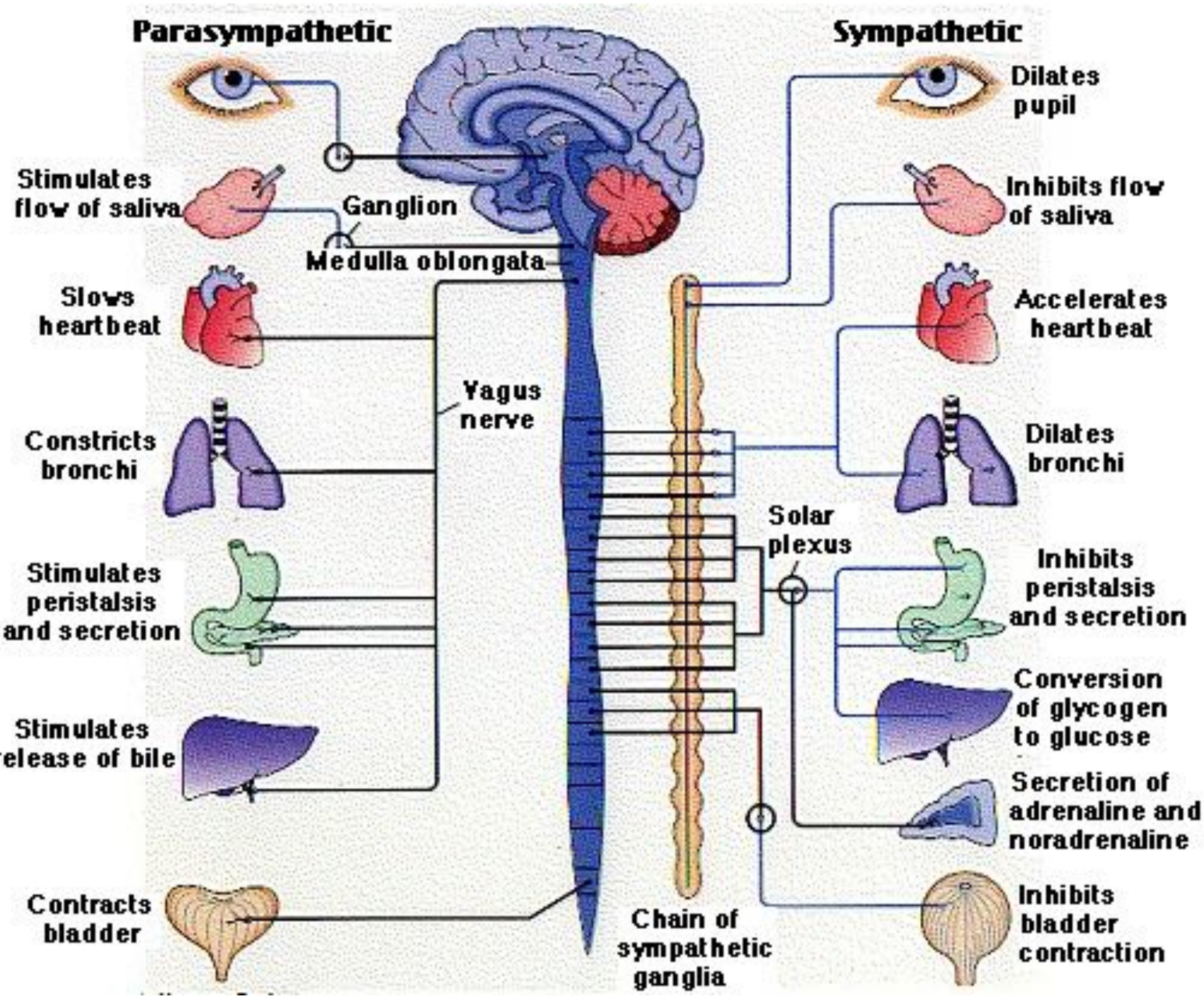
- Brain
- Spinal cord

Peripheral Nervous System

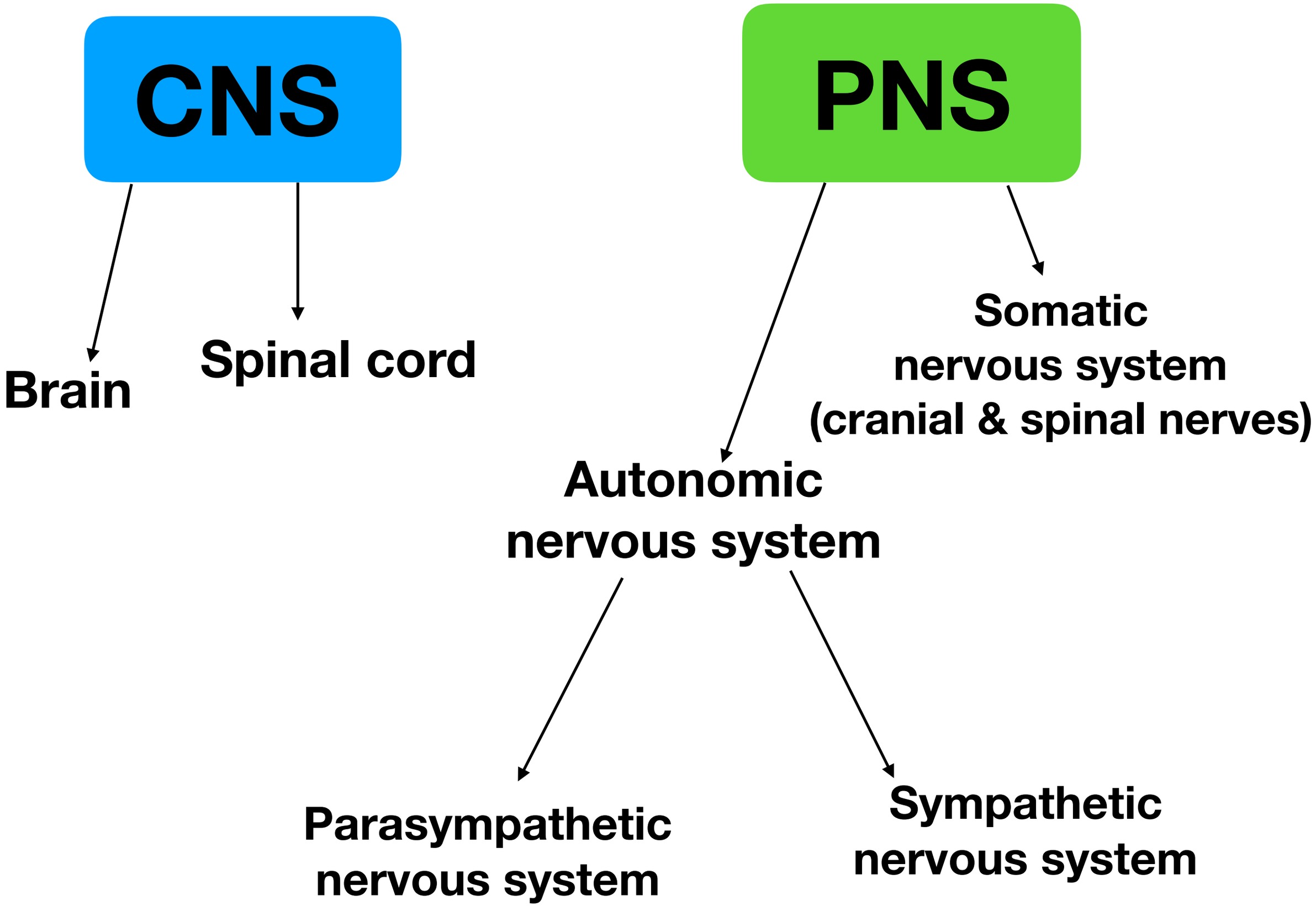
- Autonomic nervous system
- Somatic nervous system (cranial nerves & spinal nerves)

Autonomic Nervous System

- Parasympathetic nervous system
- Sympathetic nervous system


Parasympathetic
Sympathetic
Dilates pupil
Stimulates flow of saliva
Ganglion
Inhibits flow of saliva
Medulla oblongata
Slows heartbeat
Accelerates heartbeat
Vagus nerve
Constricts bronchi
Dilates bronchi
Solar plexus
Stimulates peristalsis and secretion
Inhibits peristalsis and secretion
Conversion of glycogen to glucose
Stimulates release of bile
Secretion of adrenaline and noradrenaline
Contracts bladder
Chain of sympathetic ganglia
Inhibits bladder contraction

kullabs.com


CNS
PNS
Brain
Spinal cord
Somatic
nervous system
(cranial & spinal nerves)
Autonomic
nervous system
Parasympathetic
nervous system
Sympathetic
nervous system

Antipsychotics

Antipsychotics

- Treat psychotic disorders
- Schizophrenia, paranoia, manic-depressive psychosis
- These medications block dopamine

Antipsychotic medications

- Associated side effects that have the potential to worsen or cause dysphagia

1. Sedation

2. Anticholinergic effects (enhance the sympathetic nervous system)

3. Extrapyramidal symptoms

EPS effects on swallowing

impaired/reduced mastication	**reduced BOT movement**	**reduced laryngeal movement**
tongue pumping	**impaired bolus control**	**pharyngeal residuals**
reduced tongue range of motion	**delayed initiation of pharyngeal swallow**	**aspiration**

Tardive dyskinesia

- A form of EPS
- Tardive dyskinesia produces involuntary movements impacting the oral prep/oral phase of swallowing.
- Involuntary choreiform movements (repetitive, rapid)
- Can affect the eyes, lips, tongue, jaw, and limbs.

Neuroleptic-induced choking

- This may be associated with medication-induced dysphagia (from EPS effects or tardive dyskinesia)

- Deepika, et al. 2017 - In psychiatric hospitals, asphyxiation is 100 times that of the normal population

- Yim & Chong 2009 - Chinese psychiatric patients in Hong Kong over a 12 year period; mortality rate due to choking was 8-fold higher than of the general population

Antipsychotic drug use and risk of pneumonia in elderly people

- Knol, et al
- cohort of 22,944 elderly people with at least one antipsychotic prescription
- 543 cases of hospital admission for pneumonia were identified
- Results indicated that current use of antipsychotics was associated with an almost 60% increase in the risk of pneumonia
- Similar associations were found even when elderly people with a diagnosis of delirium were excluded

Antipsychotics and Oropharyngeal Dysphagia in Hospitalized Older Patients

- Rudolph, et al.

- identified 379 inpatients older than 50 years that had VFSS from 2002-2006

- Subjects were excluded if they had a medical condition that may cause dysphagia (i.e. stroke, neurological disease, otolaryngological disorders, h/o dysphagia, and trauma)

- The focus of the study was the acute effect of antipsychotic drugs, therefore, patients on chronic antipsychotic therapy before admission were excluded

- 292 of the 379 inpatients did not meet inclusion criteria

Antipsychotics and Oropharyngeal Dysphagia in Hospitalized Older Patients

- 87 patients met inclusion criteria

- 17 patients received antipsychotics; they were matched with 51 patients who did not receive antipsychotics

- The mean Dysphagia Severity Rating Scale (DSRS) score increases (is worse) with increasing antipsychotic exposure (one point difference between the two groups)

- Clinical takeaway - the swallowing ramifications from introduction of the antipsychotic medication could lead to changes in diet consistency, maneuvers to prevent aspiration, or even alternate methods of feeding

Typical vs Atypical Antipsychotics

Typical Antipsychotics

First generation

Higher risk of EPS and tardive dyskinesia

Examples:

Chlorpromazine (Thorazine)

Loxapine (Loxitane)

Haloperidol (Haldol)

Atypical antipsychotics

Newer antipsychotics

Less adverse side effects

Examples:

Lurasidone (Latuda)
Risperidone (Risperdal)
Olanzapine (Zyprexa)
Quetiapine (Seroquel)
Aripiprazole (Abilify)
Ziprasidone (Geodon)
Clozapine (Clozaril)

Discontinuing the offending medication

- May resolve the dysphagia.
- Could take days to completely clear the body. Elderly with liver and kidney disease will have slower clearance.
- Tardive dykinesia may be irreversible. Anti-parkinson medications are ineffective.
- Persistent tardive dyskinesia is greater in the elderly on high dose therapy (especially in females).

Anti-convulsant/ anti-epileptic medications

Anti-convulsant/anti-epileptic medications

- Used to treat seizures
- May impact motor function and coordination due to changes in neurotransmitters

Associated side effects that can influence normal swallowing

sedation	impaired voluntary muscle control	gingival hyperplasia (most common with phenytoin)
confusion/mental status changes	xerostomia	severe skin and mucosal injury (in hypersensitivity reactions)
impaired cognition	mucositis	
decreased awareness	GI upset	

xerostomia

juniordentist.com

mucositis

bluemcare.com

Anti-convulsant/anti-epileptic medications
Phenytoin (dilantin)
Carbamazapine (Tegretol)
Valproic Acid (Depakene, Depakote)
Ethosuximide (Zarontin)
Lamotrigine (Lamictal)
Gabapentin (Neurontin)
Phenobarbital
Topiramate (Topamax)
Levatiracetam (Keppra)
Lacosamide (Vimpat)

Pain medications

Pain medications

- Used to treat and/or control pain levels
- Three categories of pain medications

1. Non-opioid analgesics
2. Opioid analgesics
3. Adjuvant analgesics

- Non-opioid analgesics - examples are aspirin, acetaminophen, and NSAIDs (e.g. ibuprofen)

- Opioid analgesics - narcotics (e.g. morphine)

- Adjuvant analgesics - used in combination with other agents to boost effects

Opioid Side effects that can cause dysphagia

- Sedation
- Nausea/vomiting
- Constipation
- Dry mouth
- Reduced GI motility

Opioid pain medications

Codeine
Hydrocodone/acetaminophen (Vicodin, Lortab, Lorcet, Norco)
Morphine (MS Contin)
Oxycodone (Oxycontin, Percocet)
Ocycodone and acetaminophen (Percocet, Roxicet)
Hydromorphone (Dilaudid)
Fentanyl (Duragesic)
Meperidine (Demerol)

Medications for Alzheimer’s disease

Alzheimer's disease

- Alzheimer's disease is defined as an irreversible, progressive brain disorder that slowly destroys memory and thinking skills

- 6th leading cause of death in the US

Alzheimer's medications

- Used to improve cognitive and behavioral function in patients with dementia

Alzheimer's medications

Donepezil (Aricept)

Rivastigmine (Exelon)

Galantamine (Razadyne)

Memantine (Namenda)

Many Alzheimer’s medications may cause cholinergic effects such as nausea, vomiting, diarrhea, abdominal pain, dyspepsia, anorexia, ataxia, confusion, sedation, and muscle weakness.

Dysphagia side effects of Alzheimer's medications

- Donepezil (Aricept)
- Rivastigmine (Exelon) → Cholinergic effects
- Galantamine (Razadyne)
- Memantine (Namenda) - agitation, confusion, drowsiness

Medications for Parkinson’s disease

Parkinson’s disease

- Symptoms of Parkinson’s disease include tremor, akinesia, rigidity, bradykinesia, shuffling gait, drooling, masked facies, dysarthria

- Usually diagnosed over the age of 55

Parkinson's	medications
Carbidopa/levodopa (Sinemet)	Rasagiline (Azilect)
Carbidopa/levodopa-extended release (Parcopa)	Rivastigmine (Exelon)
Carbidopa/levodopa/entacapone (Stalevo)	Rotigotine (Neupro)
Amantadine (Symmetrel)	Benztropine (Cogentin)
Tolcapone (Tasmar)	Pramipexole (Mirapex)
Apomorphine (Apokyn)	Ropinirole (Requip)

Improvement in swallowing function

- Case studies, as well as anecdotal reports, suggest improvement in swallowing function following the administration of Parkinson's medication

- Fonda, et al., case study suggests swallowing improvement in some Parkinson's patients when Sinemet (levodopa-carbidopa) was administered one hour before meals

- Specifically, improvements in the following: reduction in oral tremor, reduction in laryngeal tremor, improvements in total swallow time, reduction in laryngeal penetration w/ solids/ liquids, and reduction in aspiration of liquids

Side effects of Parkinson's medications that can impact swallowing

- anorexia
- nausea/vomiting
- dry mouth
- constipation
- confusion
- dyskinesias

Medications impacting GI function and/or causing esophageal injury

- esophageal injury
- obstruction
- altered esophageal motility
- altered LES function

Medication classes that can induce LES relaxation

- nitroglycerins
- anticholinergics
- aminophyllines
- Beta-receptor agonists
- benzodiazepines

Anticholinergics can also impact esophageal peristalsis

Symptoms/complaints with lodged pill

- feeling something “stuck”
- no symptoms
- retrosternal chest pain
- painful swallowing (odynophagia)
- food doesn’t go down
- pressure in chest

Increased risk of esophageal injury

- Pills that:
  1. have a large diameter
  2. are acid-containing (pH less than 3)
  3. have a prolonged dissolution time

Risk factors

- Extrinsic compression of the esophagus (from mediastinal mass, cardiomegaly, or vascular compression)
- GERD
- Swallowing medications with little or no fluid
- Pills that have slower dissolution rates and/or are large-sized forms

Medication groups that can cause injury to the esophagus

- Anti-inflammatory medications
- Acid-containing medications
- Bisphosphonates
- Potassium chloride supplements
- Methylxanthines
- Quinidines

Anti-inflammatory medications

Aspirin

NSAIDs (non-steroidal anti-inflammatory drugs)

- Ibuprofen (Motrin, Advil)
- Naproxen sodium (Aleve)

Steroids

- prednisone

Acid-containing medications

Cleocin (clindamycin)

Vibramycin (doxycycline)

Ery-tabs, E-mycin (erythromycin)

Sumycin (tetracycline)

Iron supplements (Slow FE, FeoSol, Feratab)

Vitamin C (ascorbic acid) supplements

Bisphosphonates

Alendroate (Fosamax)

Potassium chloride supplements

K-Dur

K-Tabs

Slow K

Methylxanthines

theophylline (Theo-Dur, Unidur, Slo-Bid)

Quinidine

Quinidex

Quinaglute

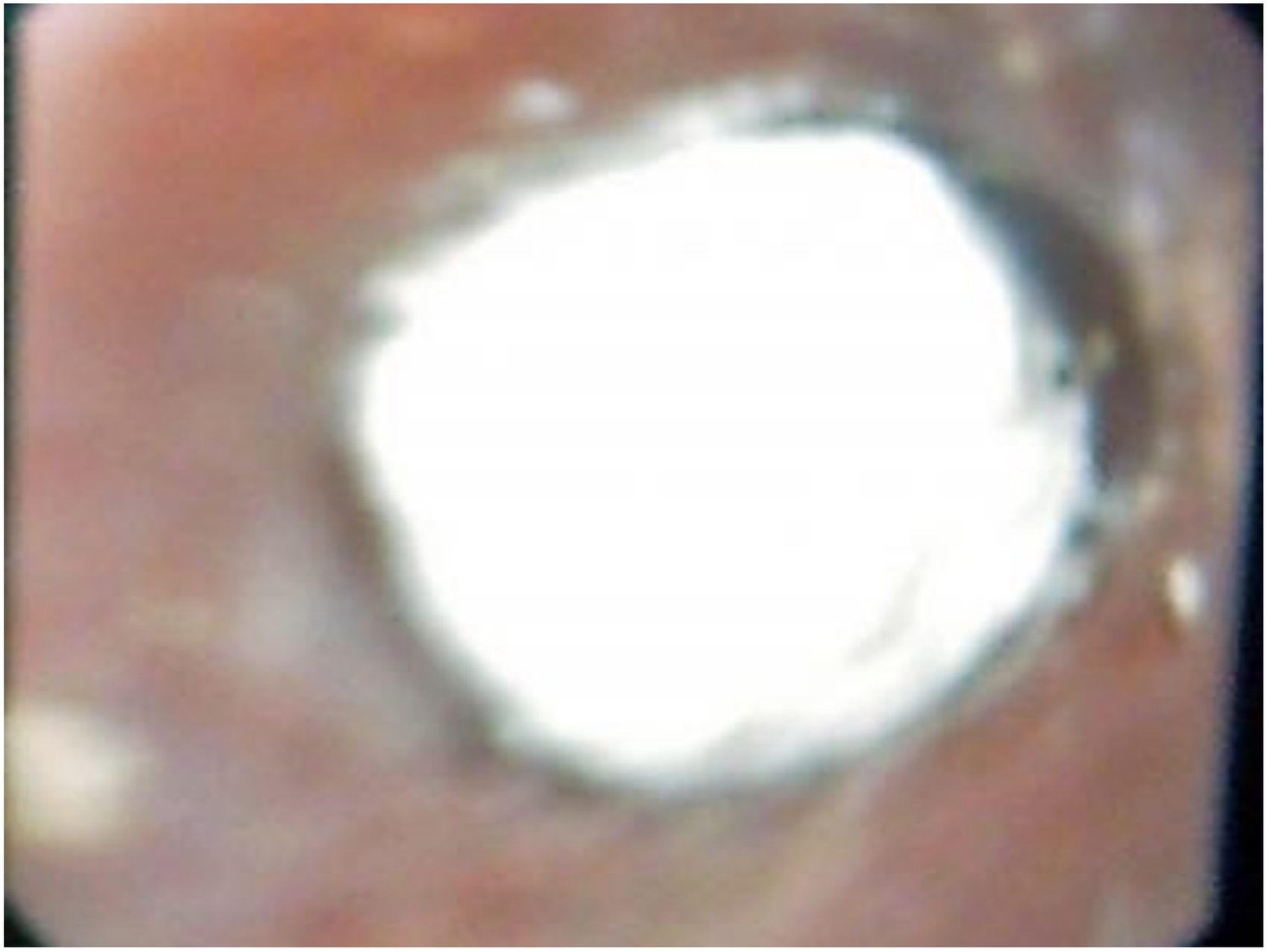
Pill-induced esophageal injury

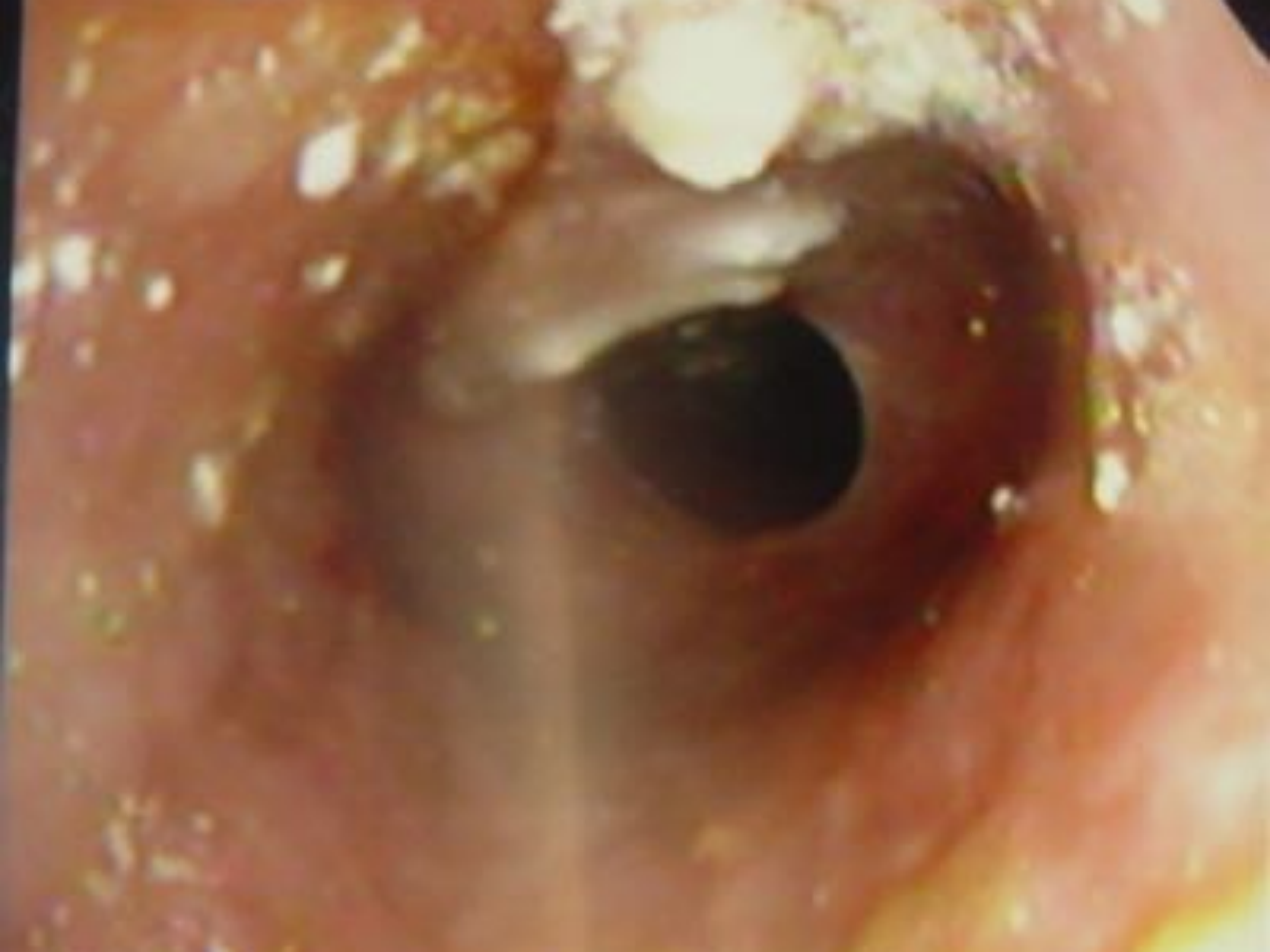
- Endoscopy records from Jan 1997 - June 2003
- 92 patients with esophageal injury were identified
- Common symptoms: odynophagia, chest pain, vomiting, dysphagia, hematemesis
- Causative pills: NSAIDs, tetracyclines, potassium chloride, alendronate, and other drugs

P Patel, B Balar. Complete Esophageal Obstruction Following Ingestion Of Nelfinavir. *The Internet Journal of Gastroenterology*. 2006 Volume 5 Number 1.

Abstract

We report a case of acute esophageal obstruction from nelfinavir ingestion. A 43-year old man presented with odynophagia and inability to swallow following ingestion of 3 nelfinavir pills. Upper gastrointestinal endoscopy revealed complete obstruction by pill fragments. Repeat endoscopy a few days later revealed a stricture at the site of obstruction. Pill-induced dysphagia is a rare but potentially serious complication of medication use.





Strategies to prevent medication-induced esophageal injury

- Upright position
- Take medications with at least 100 mL of water (3.38 ounces)
- Take “bedtime” medications at least 30 minutes prior to sleeping
- Take one medication at a time
- Consult pharmacy before crushing tablets or opening capsules
- Consult pharmacy to request liquid forms of medications

Polypharymacy & Aspiration Pneumonia:

Is there a connection?

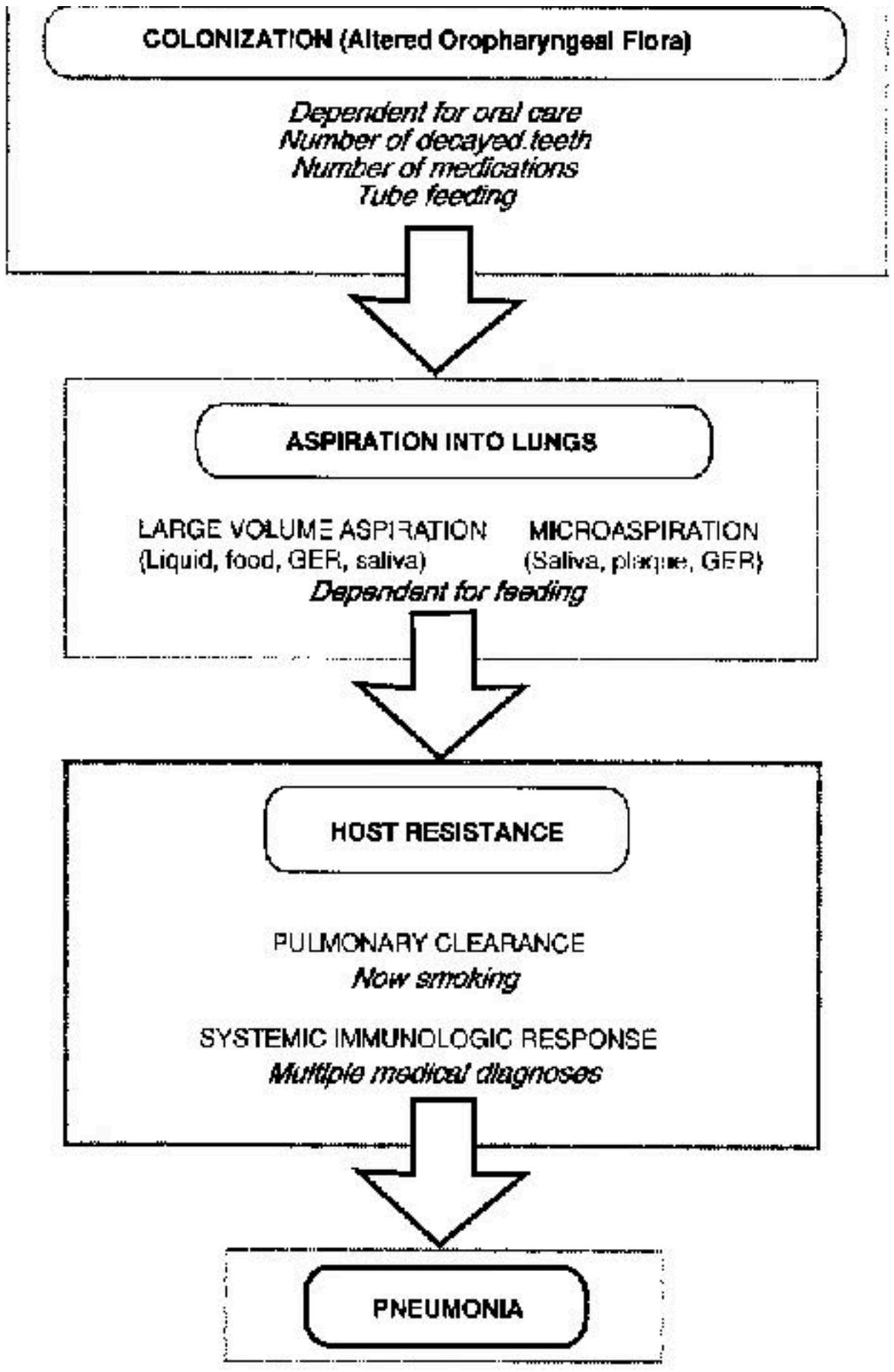
Predictors of Aspiration Pneumonia: How Important Is Dysphagia?

- Langmore, et al.
- Published in *Dysphagia* in 1998
- Landmark study

Best Predictors of Asp Pna:
Dependent for feeding
Dependent for oral care
Number of decayed teeth
Tube feeding
More than one medical diagnosis
Number of medications
Smoking

Predictors of Aspiration Pneumonia: How Important is Dysphagia?

- Langmore, et al.
- Published in 1998 in *Dysphagia*



Predictors of Aspiration Pneumonia in Nursing Home Residents

- Langmore, et al.

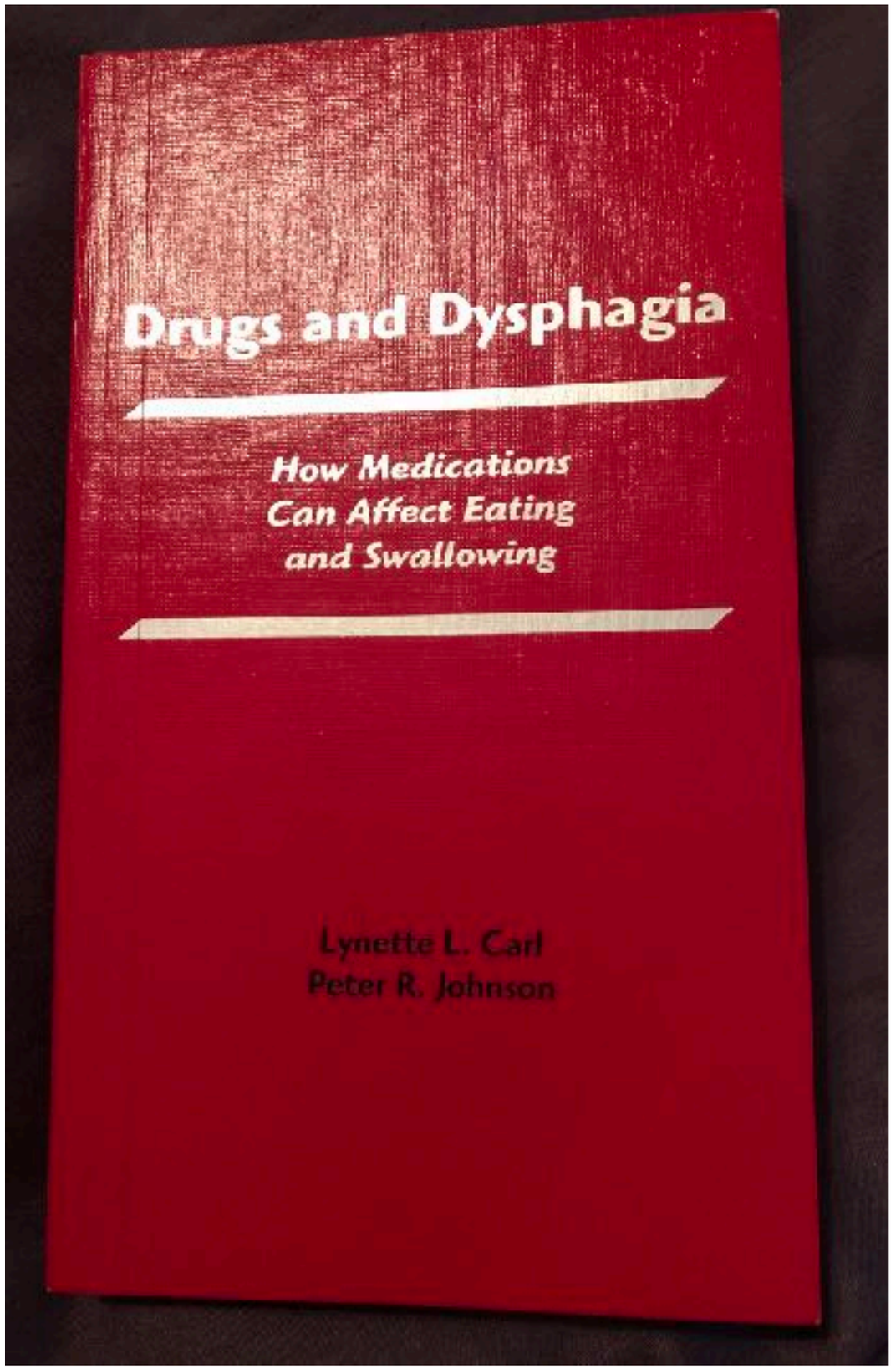
- Published in 2002 in *Dysphagia*

Significant Predictors	***of Aspiration Pneumonia***
Suctioning	UTI
COPD	Mechanically altered diet
CHF	Dependence - eating
Feeding tube	Dependence - bed
Bedfast	Dependence - locomotion
Case mix index	**Number of medications**
Indicators of delerium/less alert	Age
Weight loss	CVA
Swallowing problem/dysphagia	Tracheotomy care

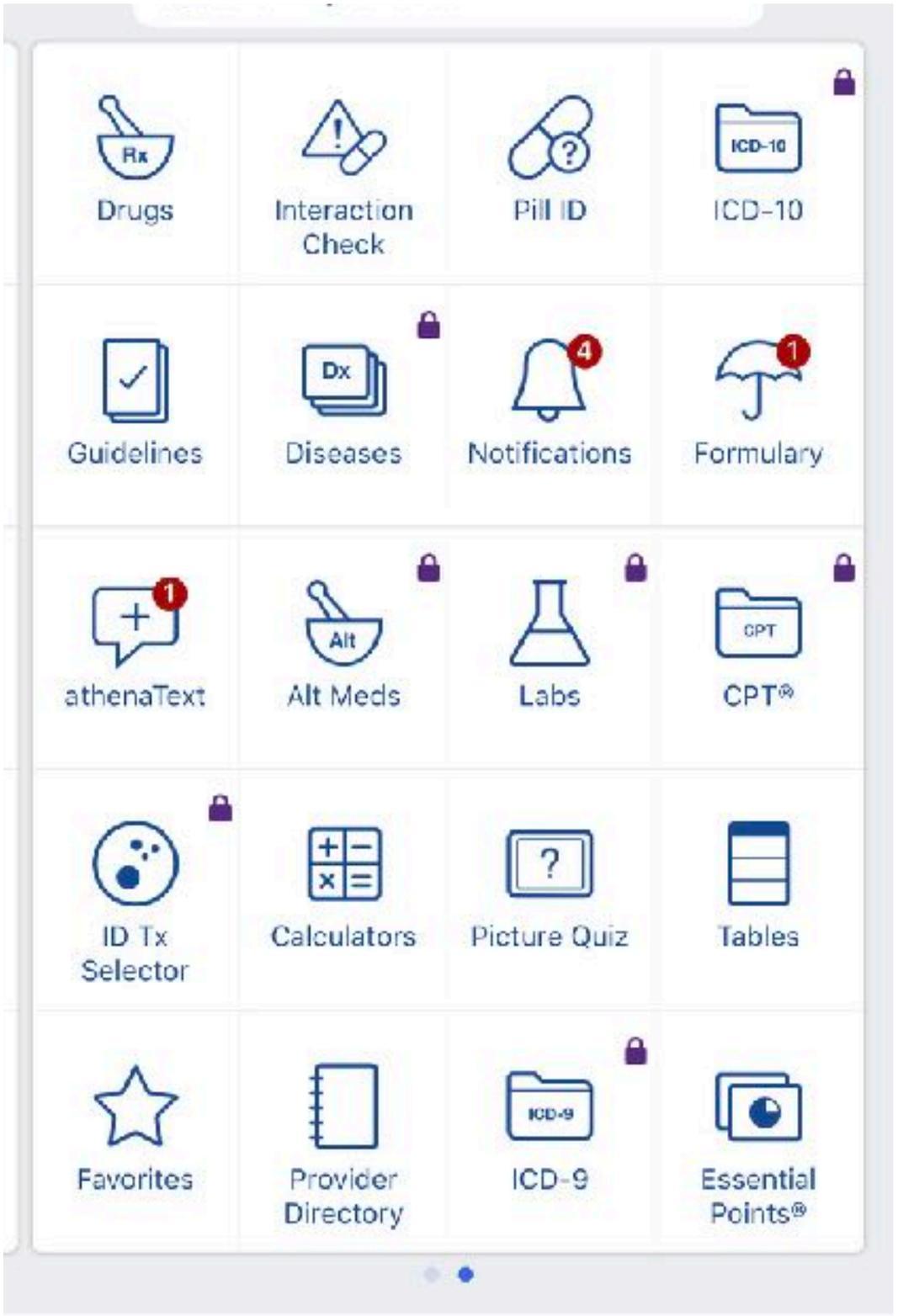
Clinical Resources

Reference book:

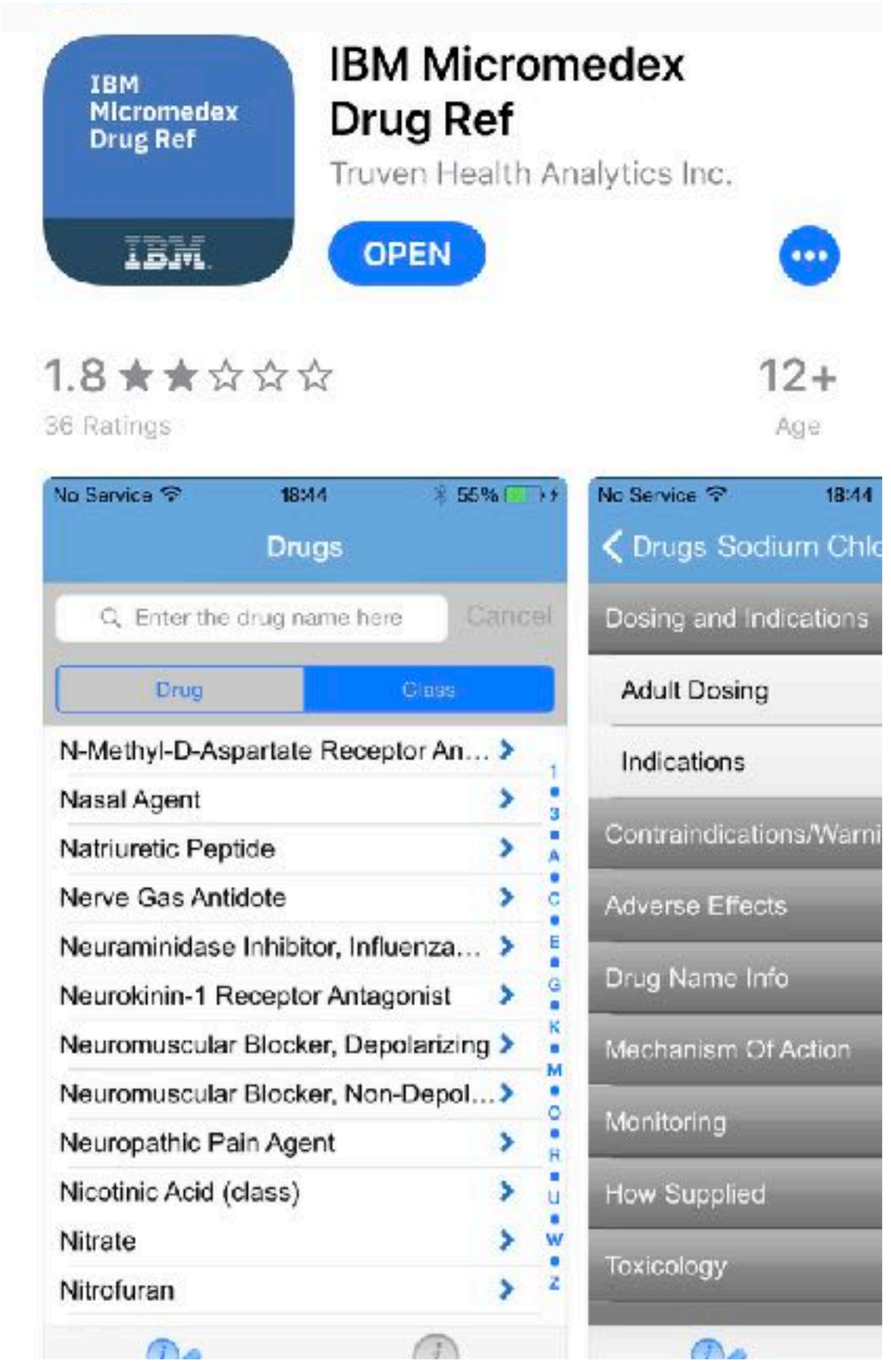
Drugs and Dysphagia
copyright 2006



epocrates app



Micromedex


IBM Micromedex Drug Ref
Truven Health Analytics Inc.
OPEN
1.8
36 Ratings
12+
Age
No Service 18:44 55%
Drugs
Enter the drug name here
Cancel
Drug
Class
N-Methyl-D-Aspartate Receptor An...
Nasal Agent
Natriuretic Peptide
Nerve Gas Antidote
Neuraminidase Inhibitor, Influenza...
Neurokinin-1 Receptor Antagonist
Neuromuscular Blocker, Depolarizing
Neuromuscular Blocker, Non-Depol...
Neuropathic Pain Agent
Nicotinic Acid (class)
Nitrate
Nitrofuran
1 3 A C E G K M O R U W Z
No Service 18:44
Drugs Sodium Chlo
Dosing and Indications
Adult Dosing
Indications
Contraindications/Warni
Adverse Effects
Drug Name Info
Mechanism Of Action
Monitoring
How Supplied
Toxicology

Thank you for your attention!

Abid S, Mumtaz K, Jafri W, et al. Pill-induced esophageal injury: endoscopic features and clinical outcomes. *Endoscopy. 2005;*37(8):740-744.

Aggestrup S, Jensen SL. Effects of pirenzepine and atropine on basal lower esophageal pressure and gastric acid secretion in man: a placebo-controlled randomized study. *Dig Dis.* 1991;9(6):360-364.

Aldridge KJ, Taylor NF. Dysphagia is a common and serious problem for adults with mental illness: a systematic review. *Dysphagia*. 2012;27:124-137.

“Alzheimer's Disease Fact Sheet.” *NIH National Institute on Aging,* August 2016, www.nia.nih.gov/health/alzheimers-disease-fact-sheet.

Balzer KM. Drug-induced dysphagia. *International Journal of MS Care*. 2000;2(1):40-50.

Boyce HW. Drug-induced esophageal damage: diseases of medical progress. *Gastrointestinal Endoscopy*. 1998;47(6).

Brunbech L, Sabers A. Effect of anti-epileptic drugs on cognitive function in individuals with epilepsy: a comparative view of new versus older agents. *Drugs*. 2002;62(4):593-604.

Carbon M, Hsieh CH, Kane JM, et al. Tardive dyskinesia prevalence in the period of second-generation antipsychotic use: a meta-analysis. *J Clin Psychiatry*. 2017;78(3):e264-e278.

Carl LL, Johnson PR. *Drugs and Dysphagia: How Medications Can Affect Eating and Swallowing*. PRO-ED, 2006.

Casey DE. Neuroleptic-induced acute extrapyramidal syndromes and tardive dyskinesia. *Psychiatric Clinics of North America*. 1993;16(3):589-610.

Corcoran E, Walsh D. Obstructive asphyxia: a cause of excess mortality in psychiatric patients. *Ir J Psychol Med*. 2003;20:88–90.

Dziewas R, Warnecke T, Schnabel M, et al. Neuroleptic-induced dysphagia: case report and literature review. *Dysphagia*. 2007;22:63-67.

Fonda D, Schwarz J, Clinnick S. Parkinsonian medication one hour before meals improves symptomatic swallowing: case study. *Dysphagia*. 1995;10:165-166.

Knol W, Van Marum RJ, Jansen PAF, et al. Antipsychotic drug use and risk of pneumonia in elderly people. *Journal of the American Geriatrics Society*. 2008; 56(4):661-666.

Kulkarni DP, Kamath VD, Stewart JT. Swallowing disorders in schizophrenia. *Dysphagia*. 2017; 32(4):467–471.

Langmore SE, Skarupski KA, Park PS, et al. Predictors of aspiration pneumonia in nursing home residents. *Dysphagia*. 2002;17(4):298-307.

Langmore SE, Terpenning MS, Schork A, et al. Predictors of aspiration pneumonia: how important is dysphagia? *Dysphagia*. 1998;13:69-81.

Layne KA, Losinski DS, Zenner PM, Ament JA. Using the Fleming index of dysphagia to establish prevalence. *Dysphagia*. 1989; 4(1):39-42.

Leder SB, Suiter DM, Warner HL. Answering orientation questions and following single-step verbal commands: effect on aspiration status. *Dysphagia*. 2009; 24(3):290.

Lindgren S, Janzon L. Prevalence of swallowing complaints and clinical findings among 50-79-year-old men and women in an urban population. *Dysphagia*. 1991;6(4):187-192.

O’Neill JL, Remington T. Drug-induced esophageal injuries and dysphagia. *The Annals of Pharmacotherapy*. 2003;37:1675-1684.

Oral mucositis-what it is-what can you do about it-blue®m. www.bluemcare.com/oral-problems/oral-mucositis.

Patel P, Balar B. Complete esophageal obstruction following ingestion of nelfinavir - a case report. *The Internet Journal of Gastroenterology*. 2006;5(1).

pdxleach. "Tardive Dyskinesia Video.” *You Tube,* May 2010, www.youtube.com/watch?v=fLwZQBJs8fl.

“Peripheral and Autonomic Nervous System.” www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/784.

Rudolph JL, Gardner KF, Gramigna GD, et al. Antipsychotics and oropharyngeal dysphagia in hospitalized older patients. *Journal of clinical psychopharmacology*. 2008;28(5):532-535.

Steele CM, Greenwood C, Ens I, Robertson C, Seidman-Carlson R. Mealtime difficulties in a home for the aged: not just dysphagia. *Dysphagia*. 1997;12(1):43-50.

Trate DM, Parkman HP, Fisher RS. Dysphagia: evaluation, diagnosis and treatment. *Primary Care Clin Office Pract*. 1996;23(3):417-432.

Xerostomia-dry mouth. www.juniordentist.com/xerostomia.html.

Yim PHW, Chong CSY. Choking in psychiatric patients: associations and outcomes. *East Asian Archives of Psychiatry*. 2009;19(4):145.

Contact information:

kristen.cline@carolinafees.com

www.carolinafees.com

Carolina
Speech Pathology