Drugs and Dysphagia

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Abstract

This article summarizes some of the major medications that may affect eating and swallowing. The medications affecting motor function, lubrication, and gastrointestinal motility are discussed. The roles of medications in taste and smell are also identified in this paper.

Introduction

There are 6.5 million Americans that have dysphagia. Thirteen to 14% of these patients are in the acute-care settings, 30-35% of patients are in rehabilitation centers, and 40-50% of patients in nursing homes have dysphagia (Campbell-Taylor, 2001; Rooney & Johnson, 2000). Jeri Logemann (2006) stated in the foreword to our book, Drugs and Dysphagia,

There are many factors that singly and in combination can increase the patient’s risk of dysphagia or can cause dysphagia (Sliwa & Lis, 1993; Stochus & Allescher, 1993; Wada et al., 2001). One of these factors is medications or combinations of medications which can worsen or even create the dysphagia problems exhibited by a patient. The clinician working with dysphagia patients must be knowledgeable about known drug effects on the oropharyngeal and esophageal mechanisms (e.g., coordination, reaction times, and gastroesophageal motility)… (p. xiii).

Medications can affect all five phases of swallowing. The anticipatory phase can be affected by central nervous system depressants (i.e., sedatives). This phase involves the preparation and introduction of food into the oral cavity and involves both decision making and physical actions (Leopold & Kagel, 1983, 1997; Brodsky, 2006). Central nervous system depressants can both alter attentional mechanisms and reduce control of striated muscles that are important for anticipatory actions that occur in preparation for swallowing (e.g., jaw opening, hand movement). There are also medications that can alter taste, smell, or appetite, and these medications can negatively affect oral intake. The oral preparatory phase, involving mastication and bolus formation, is affected by medications that can reduce taste and smell as well as medications that may cause xerostomia, such as antihistamines and anti-depressants.
The oral phase, which involves anterior-posterior transfer of a food or liquid bolus, can be affected by medications that cause xerostomia and also medications that affect motor function through depression of the central nervous system. The pharyngeal phase, which is critical for swallow triggering and efficient transport of the bolus from the oral cavity into the esophagus, is affected by anticholinergic medications such as antihistamines and antidepressant medications and by antipsychotic medications that can cause dystonia and other movement disorders. The esophageal phase, involving transport of the food into the stomach, can be affected by medications that influence acetylcholine levels and smooth muscle function (Carl & Johnson, 2006; Feinberg, 1997; Carson & Gormican, 1976; Henkin, 1994; Logemann et al., 2003; Vogel, Carter, & Carter, 2000).

**Medications Affecting Motor Function**

A large group of medications called central nervous system depressants can affect motor functions associated with eating and swallowing. Many patients who have suffered acquired brain injury require these types of medications and may exhibit altered swallowing function not just due to the brain injury itself, but also due to effects of required medications. Central nervous system (CNS) depressants include medications such as anticonvulsants, antipsychotics, antidepressants and anti-anxiety agents. These medications all affect the function of neurotransmitters in the central nervous system. Levels of neurotransmitters, such as dopamine, GABA, histamine, acetylcholine, and serotonin, can be altered by CNS depressants. As a result, motor functions associated with the coordination and activation of the phases of swallowing may be affected (Bloom, 2001; Hoffman, 2001).

The use of CNS depressants may also result in decreased level of arousal, depression of brainstem swallow function, neuromuscular blockade, impaired oral pharyngeal sensation, decreased voluntary muscle control, and xerostomia. Additionally, medications such as antipsychotics and anti-Parkinson's medications can induce movement disorders, such as tardive dyskinesia and pseudo-Parkinsonism. These movement pattern deficits can result in reduced oropharyngeal function and result in aspiration and choking (Chen, 2002; Crismon & Dornson, 2002; Curtis & Jermain, 2002; Johnson, 2001; Markowitz & Morton, 2002; Nelson, Berchou, & LeWitt, 2002).

**Medications Affecting Lubrication**

In addition to the above-mentioned medications that influence dysphagia due to changes in muscle function, there are also many medicines that can worsen dysphagia symptoms due to decreased lubrication of portions of the gastrointestinal tract. Medications that are known as anticholinergics have such effects. Examples of such medications include antihistamines, antipsychotics, and antidepressants. These medications alter the levels of the neurotransmitter histamine as well as the neurotransmitter acetylcholine and may result in xerostomia, or dry mouth, due to a reduction in saliva production. Xerostomia often interferes with the oral preparatory stage and oral stages of swallowing, altering both bolus formation and bolus transport. The reduction of saliva production also may affect the taste of foods, appetite, and subsequently oral intake. Reduction in the lubrication of the nasal passages due to these anticholinergic medications can also result in a reduction in smell and thus alter taste and oral intake (Campbell-Taylor, 2001; Carl & Johnson, 2006; Carson &
Medications Affecting Gastrointestinal Motility

In addition to medications that affect the motor function and the lubrication of the gastrointestinal (GI) tract, there are also medications that affect the motility of the GI tract. Decreases in GI motility can also result in, or worsen, dysphagia (Campbell-Taylor, 2001). Examples of these medications include antipsychotics, antidepressants, and antihistamines. Altered GI motility can result in a decrease in esophageal peristalsis, decrease in gastric emptying, and changes in esophageal sphincter function. In addition, pain medications, such as narcotics, can affect receptors in the GI tract, resulting in decreased GI motility and constipation. Such reduction in GI motility can affect both appetite and oral intake. Pain medications can also cause nausea and vomiting and thus decrease oral intake (Gutstein & Akil, 2001; Jacox, Carr, & Payne, 1994; Max, Payne, Edwards, Sunshine, & Inturrisi, 1999; U.S. Department of Health & Human Services, 1992).

There are also medications that affect the lower esophageal sphincter tone and can contribute to backward-flow or reflux of stomach contents into the esophagus. These include antidepressants, barbiturates, antihistamines, antipsychotics, benzodiazepines, calcium channel blockers, theophylline, ethanol, nicotine, estrogen replacement medications, medications related to nitroglycerin, and muscle relaxants such as baclofen. In addition to medications, some foods can affect the lower esophageal sphincter tone and contribute to reflux, including chocolate, peppermint, caffeine, tomato and citrus juice, onions, garlic, spicy foods, and foods with high fat content (Carl and Johnson, 2006; Hoogerwerf & Pasricha, 2001; Meek, 2002; Pasricha, 2001; Siepler, 2002; Williams, 2002).

There is another group of medications that can result in, or worsen symptoms of, dysphagia due to potential for damaging the mucosa of the gastrointestinal tract. Such damage in the mouth is called stomatitis; whereas damage to other parts of the mucous lining of the GI tract is called mucositis. Medications that are commonly associated with stomatitis and mucositis are those that are used in treatment of cancer (Balmer & Valley, 2002; Chabner, Ryan, Paz-Ares, Garcia-Carbonero, & Calabresi, 2001; Jacox et al., 1994; Max et al., 1999). In addition to chemotherapy medications, there are other drugs that can cause damage to the gastrointestinal tract. These medications can decrease oral intake and worsen the nutritional status of the patient. Medications such as aspirin and aspirin-like products called nonsteroidal anti-inflammatory drugs (NSAIDs), tetracyclines, rimantadine, antiviral medications used in treatment of HIV disease, and the antivirals Foscavir and Cytovene can all cause damage to the gastrointestinal mucosal lining. In some instances, anticonvulsants like Dilantin, Tegretol, Lamictal and Zonegran and antibiotics like Septra can cause a very serious allergic syndrome which results in a sloughing off of the mucosa similar to a severe burn, called Stevens-Johnson syndrome. Stomatitis can also be seen with medications called gold salts, used in the treatment of rheumatoid arthritis. In addition, medications used to treat osteoporosis such as Fosamax, Actonel, and Boniva have been associated with a mechanical lodging of the pill within the esophagus and result in focal damage of the esophagus (Carl & Johnson, 2006; Feinberg, 1997; Williams, 2002).

Medications Affecting Taste and Smell
Because oral intake can be dramatically affected by the senses of taste and
smell, medications that alter the sense of smell can result in decreased appetite and
oral intake. Examples of these medications include anti-infective medications such as
amoxicillin, tetracyclines, gentamicin, neomycin, streptomycin, Floxin, rimantidine,
and pentamidine. Altered smell is also associated with the use of levodopa for
Parkinson disease, nasal sprays for congestion, as well as cholestyramine and statin
medications for lowering cholesterol (Henkin, 1994).

Other medications can alter or reduce the sensation of taste. Examples include
nicotine, anticholinergics, and many medications used to treat depression. Other
medications include anti-infective medications such as Amphotericin B, ampicillin,
cephalosporins, quinolone antibiotics like Cipro and Levaquin, Biaxin, ethambutol,
antivirals to treat HIV infection, Lamisil, Flagyl, and sulfa antibiotics. Many
medications used to treat cardiac problems can also alter the sense of taste; these
include diuretics (water pills), amiodarone, ACE inhibitors, calcium channel blockers,
Tambocor, Persantine, methylidopa, and beta blockers. Anticonvulsant medications
such as Dilantin and Tegretol, benzodiazepines such as Valium, muscle relaxants
such as baclofen, Flexeril and Dantrium can also reduce the taste sensation. NSAID
products such as ibuprofen, the antipsychotic Risperdal, chemotherapy agents,
antacids, anti-spasmodics, calcitonin (used to treat osteoporosis), and Neupogen (used
in cancer patients to increase the white blood cell count) are examples of medications
that can alter taste, as well. The diabetes medications Glucatrol, Orinase, and insulin
have also been shown to alter taste sensation. Medications used to treat high
cholesterol such as statins (i.e., Lipitor and Zocor) and omega fatty acids can also alter
taste, as can medications that are given by the route of inhalation such as those that
are used to treat asthma and COPD (Henkin, 1994; Willoughby, 1983).

The group of medications called anticholinergic medications can dramatically
change taste, smell, and GI motility, influencing dysphagia. Examples of these
medicines include medications that are commonly used to treat excessive drooling,
allergy, nausea, reduce gastrointestinal secretions, and urinary incontinence. These
include transdermal scopolamine, clonidine, Banthine, Robinul, Phenergan,
Compazine, Dramamine, Atarax, Vistaril, Tigan, Benadryl, and Detrol. These
medications have side effects including xerostomia, altered taste, nausea, vomiting,
heartburn, constipation, urinary retention, cardiac arrhythmias, dizziness, confusion,
tremor, nasal congestion, hallucinations, abdominal pain, diarrhea, drowsiness,
indigestion, and vertigo (Carson & Gormican, 1976; Henkin, 1994; Willoughby, 1983).

**Summary**

Medications can play a multi-factorial role in dysphagia prevention and
treatment. We have discussed the role of medications on motor function, lubrication,
gastrointestinal motility, taste, and smell. Medications also play a significant role in
the occurrence and treatment of dysphagia in disorders such as Parkinson’s disease,
Alzheimer’s disease, psychosis, and depression. As suggested by Carl and Johnson
(2006),

The competent clinician is aware of the need to review the patient’s
medications as part of the dysphagia evaluation. In some instances, medication
alterations may be needed to improve the patient’s dysphagia. The therapist
may need to assume a proactive position occasionally and consult with a
primary care physician regarding the impact of medications on the patient’s
ability to swallow. The prudent clinician should also utilize a team approach by consulting with the pharmacist as a source of valuable information regarding the patient’s medication regimen. (p. 34).

References


Carl, L. C., & Johnson, P. R. (2006). *Drugs and dysphagia: How medications can affect eating and swallowing.* Austin, TX: PRO-ED.


