Swallowing disorders in the elderly

Dr A. Lagier
Service d’ORL, CHU de Liège

Aude.lagier@chu.ulg.ac.be
To Swallow:
Cause or allow something to pass down the throat
**Definitions**

- **Swallowing**
- **Appetite:** Wish to eat, hungry sensation
- **Eating pleasure**
- **Feeding:** Providing to the individual the food necessary for their subsistence
- **Nutrition:** Process of taking in and using food, or the scientific study of this
Normal Swallowing adults

Physiology of swallowing
Physiology of swallowing

- **Swallowing function**
  - Coordination of muscles and joints for the progression of the bolus from the mouth to the stomach
  - Coordination: sensorial, motor and chronological of the different anatomical structures of oral cavity, pharynx and oesophagus
Physiology of swallowing in adults
Physiology of swallowing in adults

- **Combination**
  - Propulsion forces
    - pass the bolus to the stomach
  - Openning and closing of « sphincters »
    - « drive » bolus in the good way and good timing into the aero-digestive crossroads

- **Neurological control**
  - Cortical, central grey nuclei, cerebellum
  - Cranial nerves
  - 40 pairs of muscles
Physiology of swallowing in adults

- 4 phases of swallowing:
  - 1. Preparatory Phase
  - 2. oral Phase
  - 3. Pharyngeal Phase
  - 4. œsophagéal Phase

Synergy and interaction between the different phases

The dysfunction of one phase can have consequences on the others

Voluntary

Reflex

Vegetative
Swallowing in the elderly

Healthy and pathological
Definitions

- **Dysphagia**: Any disruption in the swallowing process

- **Oropharyngeal dysphagia**: difficulty to effectively move the alimentary bolus from the mouth to the oesophagus

- **Swallowing disorders/dysphagia**
  - **Stasis**: slowing or stoppage of the normal flow of a bodily fluid or semi-fluid
  - **Aspiration**: entry of matrial in the airway BELOW the vocal folds
  - **Laryngeal penetrations**: entry of matrial in the larynx until the level of the vocal folds
Definitions

- **Presbyphagia:**
  - **Primary presbyphagia:**
    - Effect of natural healthy aging on the head and neck anatomy, on physiology and neural mechanisms of swallowing function (Ney et al. 2000)
  - **Secondary presbyphagia:**
    - Increase of the prevalence of chronic pathologies, side effects of medications causing swallowing disorders

- **Presbyphagia ≠ Dysphagia**
  - Compromised compensatory ability
  - Naturally diminished functional reserve

→ Susceptibility to dysphagia in the elderly
Continuum presbyphagia → dysphagia

- Progressive degradation of the swallowing function
  → spontaneous adaptations made
    - Eat smaller amount
    - Adapt the quality
    - Longer meals
    - Avoid to eat or drink

  → Persons may not complaint about swallowing spontaneously

  → Importance of determining early dysphagia stage to prevent evolution toward dysphagia complications
Prevalence of presbyphagia

- Questionnaires in >60 year-old healthy people (Brasil)
  - 21% declare previous choking,
  - 10% coughing,
  - 7% throat clearing in Brasil

- Fiberoptic Endoscopic Evaluation of Swallowing (FEES):
  - 39% pharyngeal residue
  - 6% saliva stasis
  - 9% penetration
  - 2% aspiration
  - 8% loss of laryngeal sensitivity

- No reliable link between complaints and FEES findings

De Lima Alvarenga et al., 2017
Prevalence of dysphagia in the elderly

- >65 y-o:
  - 13% of the total population
  - 51% of the institutionalized population
  - 47% of frail elderly hospitalized for acute illness
  - Prevalence of dysphagia increased with presence of neurological disease, age and frailty.
  - Dysphagia is a factor of worse prognosis

- Among independently living people
  - 70-79 y-o: 16%
  - >80 y-o: 33%

- Cabre M et al., 2010
Pathophysiology of presbyphagia

Figure 1 Factors associated with dysphagia in older persons.

Oral Phase modifications

- Impaired dental status

- Decreased force of the tongue
  - Decrease in the maximal isométric contraction
  - Stability of the force amplitude during swallowing (sub-maximal effort), but slower contraction

- Xerostomia
  - Associated pharyngeal and oesophageal dryness
  - Decreased saliva-producing acinar cells
  - Not significant modification with age, but higher drying effect of medications

- Modification of sensory inputs
  - Taste and olfaction,
  - Temperature
  - Tactile sensation
Oral Phase modifications
Oral Phase modifications

- Impaired dental status + Decreased force of the tongue + Xerostomia
  - Prolonged oral phase
  - Prolonged meals

- Modification of sensory inputs of taste and olfaction,
  - Decreased eating pleasure

- Decreased intake quantities
Pharyngeal Phase modifications

- Changes in the cervical spine

- Weak sensitivity of the trigger zones of swallowing reflex

- Reduced mass and function of the swallowing muscles
  - Reduced pharyngeal constriction
  - Reduced base of tongue retraction
  - Reduced laryngeal excursions

- Association of whole body muscle mass and function with swallowing muscle mass and function probable.

Ney et al., 2009, D Lima alvarenga et al., 2017, Wirth 2016
Pharyngeal Phase modifications

- Changes in the cervical spine

- Weak sensitivity of the trigger zones of swallowing reflex
  - Initiation of pharyngeal and laryngeal events delayed
    - Including the laryngeal closure
  - More time in the vicinity of the open airway, by pooling or pocketing in the pharyngeal recesses
  - Penetration of the bolus into the larynx occurs more often and to a deeper and more severe level than in younger adults

- Reduced mass and function of the swallowing muscles
  - Reduced pharyngeal clearance (pharyngeal stasis)
  - More time in the vicinity of the open airway, after swallow
Pharyngeal Phase modifications
Oesophageal Phase modifications

- Upper esophageal sphincter (UES)
  - Part of the oesophagus the most susceptible:
  - Reduction of the cross-sectional area of sphincter opening
  - Mainly the antero-posterior diameter

- 4 mechanisms of UES opening:
  - UES relaxation: cessation of the cholinergic excitatory signals to the cricopharyngeus muscle
  - Distensibility of the UES
  - Distraction of the hyo-laryngo-cricoid complex anteriorly and superiorly by contraction of supra-hyoid muscles
  - Pressure imparted from within the of UES

- Body and inferior oesophageal sphincter (IES)
  - Loss muscle peristaltism
  - Loss of tissue elasticity
Consequences of dysphagia

- Aspiration pneumonia
  - Result of inhaling bacterially contaminated saliva or foreign substance
  - 5-15% of community-acquired pneumonias
  - Most common complication of aspiration
  - 30-day death rate: 21% overall, 30% in health care-associated aspiration pneumonia

- Chronic inflammation of the lungs, lung abscesses

- Sepsis
Consequences of dysphagia

- **Dehydration and Malnutrition**
  - Dysphagia
    - Reduction of oral intake
    - Fear to eat
  - Co-responsible factors of malnutrition and dehydration
    - Anorexia of aging
    - Cognitive decline
    - Social, emotional, health problems
    - Neurological disease and decreased ability to eat independently

- **Effects of malnutrition and dehydration on dysphagia**
  - Malnutrition → Sarcopenia
  - Dehydration → Xerostomia and oral bacterial colonization

- Reduced quality of life
Screening, Diagnosis, and Management of swallowing disorders in elderly
Early Management: prevention +++

- Dental care
- Limitation of medication with impact on swallowing function
  - Medication with anti-cholinergic action
    - Xerostomia
  - Sedatives
    - Reduction of the vigilance
  - Opioïds
    - Suppression of the coughing reflex
  - Neuroleptics
    - Secondary parkinsonism
Early Management: prevention +++

- Screening of presbyphagia/early stage of dysphagia → swallowing therapy or preventive maneuvers
  - In active, independent elderly population
  - In frail elderly before dysphagia or malnutrition complications
  - Screening tool: FEES
Screening of dysphagia

- Screening
  - Identification of patients with greatest risk of dysphagia
  - Nurse, speech therapist
### Screening

- If failure of any item:
  - Discontinue the test
  - Call the SLP

#### A) Before water intake:
(Mark either normal, abnormal or unable to assess for each task.)

<table>
<thead>
<tr>
<th>Task</th>
<th>Normal</th>
<th>Abnormal</th>
<th>Unable to assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have patient say ‘ah’ and judge voice quality.</td>
<td></td>
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<tr>
<td>2. Ask patient to stick their tongue out and then move it from side to side.</td>
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<tr>
<td>3. Stroke posterior wall of throat on each side and ask patient if they can feel it.</td>
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<td></td>
</tr>
</tbody>
</table>

#### B) Water Intake:
While the patient is sitting upright give 10 x 5ml (teaspoon) boluses followed by a sip from a cup. Ask patient to say “ah” after each swallow. If any coughing or change in voice quality occurs, stop the test and check appropriate box. Do not mark normal findings in this section. If you are unable to continue the water swallows to your satisfaction of patient safety, record the reason for terminating in the Unable to Assess box.

<table>
<thead>
<tr>
<th>Swallow number</th>
<th>Cough during/after swallow</th>
<th>Wet voice after swallow</th>
<th>Unable to Assess (Give reason)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swallow 1</td>
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<tr>
<td>Swallow 2</td>
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<td>Swallow 3</td>
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<td>Swallow 5</td>
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<td>Swallow 6</td>
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<td>Swallow 7</td>
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<td>Swallow 8</td>
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<tr>
<td>Swallow 9</td>
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<td></td>
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<tr>
<td>Swallow 10</td>
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<td></td>
</tr>
<tr>
<td>2) Free drinking from a cup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Drool during water swallows?</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### C) After water intake:

<table>
<thead>
<tr>
<th>Task</th>
<th>Normal</th>
<th>Abnormal</th>
<th>Unable to Assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have patient say ‘ah’ again and judge voice quality</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### D) Results:  
- □ Passed (no abnormal results)  
- □ Failed (1 or more abnormal results)  

If Failed initiate referral to SLP  
Nurse’s Signature:
Clinical assessment

- Speech Language Pathologist

- Comprehensive clinical assessment of swallowing
  - Comprehensive medical history
  - Physical exam of oral and motor function
  - Assessment of food intake

- Repeated for evolution
- Orientation of the specific management
  - Instrumental assessment
  - treatment
Instrumental assessment: FEES and VFS

- Fiberoptic Endoscopic Evaluation of Swallowing
- Videofluoroscopy of swallowing
- Complementary
- Diagnosis of swallowing disorders
- Test behavioral strategies or bolus alteration: «therapeutic» evaluations
Instrumental assessment: FEES

- **Fiberoptic Endoscopic Evaluation of Swallowing**
  - **Before swallowing**
    - Preliminary assessment of the anatomy
    - Secretions/saliva stasis
    - Movement of key-structures in non-swallowing tasks
    - Sensitivity
  - **During salivary swallowing task**
    - White-out during swallowing
  - **During swallowing**
    - Pasty, liquid and solid bolus,
    - Various sizes
Instrumental assessment: FEES

- Fiberoptic Endoscopic Evaluation of Swallowing
  - Before swallowing
    - Preliminary assessment of the anatomy
    - Secretions/saliva stasis
    - Movement of key-structures in non-swallowing tasks
    - Sensitivity
  - During salivary swallowing task
    - White-out during swallowing
  - During swallowing
    - Pasty, liquid and solid bolus,
    - Various sizes
Consistencies tested

- Thickened blued water/gel
  - Blued with methylene blue (10mg/1mL per 1L water)
  - 2 spoons of thickening powder/50mL
  - 5x Teaspoon

- Liquid (blued water)
  - Teaspoon
  - Little sips with an indented glass

- Soft cake
  - Little piece
Instrumental assessment: FEES
Instrumental assessment: VFS

- **Videofluoroscopy of swallowing**
  - Complementary to the FEES
  - Traditional gold standard for diagnosis of dysphagia

- Swallowing boluses prepared with baryum (liquid, fluid, solid)

- Exploration of the 3 phases including oesophageal phase
- Accurate evaluation of the UES
Clinical Case
Management: treatments

- Patients with mild symptoms
  - Reduction of volume and increase in bolus viscosity

- Patients with severe symptoms
  - Also need changes in head posture,
  - Increased sensory input
  - Swallowing maneuvers
  - Other active treatments

- Patients with severe aspiration or inefficient swallowing
  - Tube feeding in addition to swallowing therapy
  - Minimal safe oral intake to maintain clearance of the throat
  - Oral hygiene mandatory
Management: Treatments

- Three general principles:
  - Main diagnosis
  - Patient’s resources and needs
  - Setting the patient is living and treated in

- Therapeutic swallowing intervention strategies
  - Adaptative strategies
    - Dietary modifications
  - Compensatory strategies
    - Postural changes, specific swallowing strategies
  - Rehabilitative maneuvers
    - Head-lifting exercises, mendelsohn maneuver
Management: Nutritional intervention

- Objectives
  - Reduction of aspiration
  - Provision of the adequate amounts of energy and nutrients

- All kind of nutritional support
  - Standard oral nutrition
  - Texture modified diets
  - Thickened liquids
  - Complete enteral or parenteral nutrition
  - Kind and duration of interventions depend on
    - Type and extent of swallowing disturbance
    - Nutritionnal status
    - Comorbidity

- Interdisciplinary intervention mandatory
Management: Artificial feeding

- Invasive procedure

- Indications
  - Gap between oral intake and nutritional demand
  - Function of the patient’s general prognosis

- Guidelines for tube feeding in geriatry if:
  - No oral intake possible for >3 days
  - Oral intake <50% of demands for >10 days
  - Based on individual comprehensive patient assessment.
Management: Artificial feeding

- Enteral nutrition preferred to parenteral
  - Lower rate of septic complications, cost-effectiveness

- Naso-gastric tube (NGT) vs percutaneous endoscopic gastrostomy (PEG)
  - No difference in mortality, complications, risk of pneumonia
  - Fewer intervention failure with PEG
  - Better return to oral intake with NGT

- Indications of PEG:
  - if enteral feeding likely to be needed for >28 days
  - If NGT rejected or not tolerated and artificial nutrition for >14 days

- NGT does not significantly interfere with swallow training
- Maintain as often as possible some additional oral intake according to the abilities of the patient
Dysphagia and dementia

- Most patient with dementing illness develop dysphagia
  - Dysphagia = prognosis factor of dementia

- Inability to follow the instructions
- Difficulty to transfer knowledge in daily life
- Upright position, oral hygiene, intact vigilance checked before eating or drinking
- Thickened liquids and/or chin-down posture

- PEG is not recommended in severe dementia:
  - does not prevent pneumonia,
  - does not improve the prognosis
Dysphagia in Parkinson disease

- 80% of all patients with PD experience dysphagia at some stage of the disease
- 130 months between 1st symptom and severe dysphagia

- No general recommendation for dysphagia management
  - Selection of techniques depend on individual pattern of dysphagia in each patient
  - LSVT, thermal-tactile stimulations, compensatory maneuvers
  - Thickened liquids (>chin tuck maneuver)
  - Expiratory muscles strength exercises
  - Video-assisted swallowing therapy
  - Individual assessment of levodopa responsiveness on swallowing function
Conclusion

- The earliest management is the most effective treatment of dysphagia
- Always think about potential swallowing disorder
  - Dysphagia is often unrecognized with serious health consequences
  - Especially in frail elderly
  - During acute illness
Références


