

Early detection of dysphagia and dysarthria in children with neuromuscular disorders: diagnostic accuracy of a Screeninglist for Physicians

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Introduction

In pediatric neuromuscular disorders (pNMD) dysarthria and dysphagia are often reported¹. Early detection and monitoring of dysphagia is necessary to avoid consequences as malnutrition, choking or aspiration pneumonia². Reduced intelligibility due to dysarthria often causes problems in communication³ and might hamper social participation. We developed an extensive tool in pNMD: Diagnostic list for Dysphagia and Dysarthria in pNMD (DDD-pNMD). DDD-pNMD consists of a two-step diagnostic process: a Screeninglist for the physician and a diagnostic part for the speech language therapist (SLT).

Objective

The aim of this study was to test the diagnostic accuracy of the Screeninglist of the DDD-pNMD.

Material & Methods

Data were collected on 132 children (mean age 10;06, range 2;0-19;0) with pNMD at the Radboud university medical center Nijmegen and at Klimmendaal Rehabilitation specialists, Arnhem. All children were screened on dysphagia and/or dysarthria by both the physician (Screeninglist DDD-pNMD) and SLT ("gold standard").

n		132
Age (years;months) , range (mean in years;months)		2;0 – 19;0 (10;6)
Gender, n (%)	Male	95 (72)
	Female	37 (28)
NMD, n (%)	Anterior horn cell	6 (4,5)
	Nerve fiber	9 (6,8)
	Neuromuscular junction	1 (0,8)
	Muscular level, divided in:	116 (87,9)
	Muscular dystrophy	60 (45,4)
	Myotonic dystrophy	14 (10,6)
	Congenital myopathy	32 (24,2)
	Metabolic myopathy	10 (7,6)

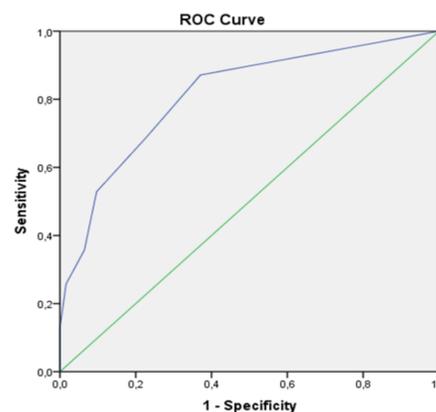
Questions Screeninglist Physician (DDD-pNMD)

1. Do pneumonia's or respiratory infections occur?
2. Is there choking or coughing during eating or drinking?
3. Does the feeling occur that food sticks in the throat?
4. Are mealtime durations longer than 30 minutes?
5. Are meals adjusted to make swallowing/chewing easier?
6. Are there any problems with teeth (jaw opening, cleaning, position)?
7. Does drooling occur?
8. Are there any problems with intelligibility?
9. Is intelligibility decreasing during the day?

Results

Using the theoretical cut-off point of ≥ 1 , the sensitivity resp. specificity of the Screeninglist was 87% and 61%. The percentage of children being correctly identified as non-dysphagic and/or non-dysarthric was 81% (negative predictive value) and the positive predictive value of the Screeninglist was 72%. The prevalence of dysphagia and/or dysarthria was 53%. The area under the ROC curve was 0.81.

Sensitivity = 87%	Dysphagia/dysarthria diagnostics by SLT (Gold standard)		Total
	Present	Absent	
Specivicity = 61%	Positive	61	85
Prevalence = 53%	Negative	9	47
Screeninglist DDD-pNMD (indextest)		70	132



Discussion

The Screeninglist of the DDD-pNMD has excellent sensitivity. The cut-off point of ≥ 1 on the ROC-curve is good. This study shows that the list can be used by the physician to screen for dysphagia and dysarthria in children with pNMD. This first step in the screening process is important for timely referring to the SLT.

Conclusion

The Screeninglist of the DDD-pNMD is an easy and quick screening by the physician to detect signals of dysphagia and/or dysarthria in pNMD in order to accurately refer to an SLT. The list is a valuable and valid tool for clinical practice.

1. Van den Engel-Hoek et al, *J Neurom dis* 2015; 2(4):357-369
2. Chen et al, *J Pediatrics* 2012; 160(3):447-451
3. Dykstra et al, *Sem Speech Language* 2007; 28(4):301-311

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