

# 수정된 연하곤란사정도구와 비디오 연하영상 조영술의 흡인 위험 예측비교

문경희<sup>1</sup> · 손현숙<sup>2</sup> · 이은석<sup>2</sup> · 백은경<sup>2</sup> · 강은주<sup>2</sup> · 이승희<sup>2</sup> · 한나리<sup>2</sup> · 이민혜<sup>2</sup> · 김덕용<sup>3</sup> · 박창기<sup>4</sup> · 유지수<sup>5</sup>

<sup>1</sup>

<sup>2</sup>

<sup>3</sup>

, <sup>4</sup>University of Illinois at Chicago , <sup>5</sup>

## Comparison for Risk Estimate of Aspiration between the Revised Dysphagia Assessment Tool and Videofluoroscopy in Post-Stroke Patients

Moon, Kyung Hee<sup>1</sup> · Sohn, Hyun Sook<sup>2</sup> · Lee, Eun Seok<sup>2</sup> · Paek, Eun Kyung<sup>2</sup>  
Kang, Eun Ju<sup>2</sup> · Lee, Seung Hee<sup>2</sup> · Han, Na Ri<sup>2</sup> · Lee, Meen Hye<sup>2</sup>  
Kim, Deog Young<sup>3</sup> · Park, Chang Gi<sup>4</sup> · Yoo, Ji-Soo<sup>5</sup>

<sup>1</sup>Director, Division of Nursing, Severance Hospital

<sup>2</sup>Registered Nurse, Department of Nursing, Severance Hospital

<sup>3</sup>Associate Professor, Department and Research Institute of Rehabilitation Medicine, Yonsei University College of Medicine, Seoul, Korea

<sup>4</sup>Researcher, University of Illinois at Chicago, IL, USA

<sup>5</sup>Professor, College of Nursing · Researcher, Nursing Policy Research Institute, Yonsei University, Seoul, Korea

**Purpose:** The purpose of this study was to determine the significant factors for risk estimate of aspiration and to evaluate the efficiency of the dysphagia assessment tool. **Methods:** A consecutive series of 210 stroke patients with aspiration symptoms such as cough and dysphagia who had soft or regular diet without tube feeding were examined. The dysphagia assessment tool for aspiration was compared with videofluoroscopy using Classification and Regression Tree (CART) analysis. **Results:** In CART analysis, of 34 factors, the significant factors for estimating risk of aspiration were cough during swallowing, oral stasis, facial symmetry, salivary drooling, and cough after swallowing. The risk estimate error of the revised dysphagia assessment tool was 25.2%, equal to that of videofluoroscopy. **Conclusion:** The results indicate that the dysphagia assessment tool developed and examined in this study was potentially useful in the clinical field and the primary risk estimating factor was cough during swallowing. Oral stasis, facial symmetry, salivary drooling, cough after swallowing were other significant factors, and based on these results, the dysphagia assessment tool for aspiration was revised and complemented.

**Key words:** Deglutition disorders, Risk assessment, Aspiration, Fluoroscopy

## 서론

### 1. 연구의 필요성

(Jung, Lee, Hong,

& Han, 2005).

주요어 : 연하곤란사정도구, 흡인, 비디오연하영상 조영술

Address reprint requests to : Yoo, Ji-Soo

College of Nursing, Yonsei University, 250 Seongsan-ro, Seodaemun-gu, Seoul 120-752, Korea  
Tel: 82-2-2228-3252 Fax: 82-2-392-5440 E-mail: yoojs48@yuhs.ac

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2005).

(Paik, Kim, Kim, Oh, & Han, 2005).

30.0- 45.0%

(Park et al., 2008)

(Paek et al., 2007).

(Park et al., 2008).

3

12 (Martino et al., 2005).

(Paek et al., 2007).

(Park et al., 2008). 34 5 8

(Paek et al., 2007)

(Martino et al., 2005).

Classification and Regression Tree (CART)

(Jung et al., 2005).

Massey Jedlicka (2002)

25

, Nishiwaki (2005)

(Han, Paik, & Park, 1999, 2001),

(Jung, Lee, Hong, & Han,

(Clinical

2005).

(Paik, Kim, Kim, Oh, &

Han, 2005).

(Park et al., 2008)

30.0- 45.0%

(Paek

et al., 2007).

(Park et al., 2008).

3

12 (Martino et al.,

2005).

(Paek et al., 2007).

(Park et al., 2008).

34

5

8

(Paek et al., 2007)

(Martino et al.,

2005).

Classification and Regression Tree (CART)

(Jung et

## 2. 연구 목적

al., 2005).

Massey Jedlicka (2002)

25

, Nishiwaki (2005)

## 연구 방법

(Han, Paik, & Park, 1999,

## 1. 연구 설계

2001),

(Jung, Lee, Hong, & Han,

(Clinical

Diagnosis)

## 2. 연구 대상

20

(SPSS Inc., Chicago, IL, USA)

Diagnosis)

SPSS Answer Tree

, CART

estimate error)

CART

(Muller & Möckel, 2008).

(Clinical

CART

(risk

( )

57 (28.2%), 72 (35.7%),  
73 (36.1%)  
101 (50.0%), 68 (33.7%) (Table 1).  
119 (58.9%),  
69 (34.1%), 67  
(33.2%), 64 (32.0%),  
63 (31.2%),  
59 (29.4%),  
57 (29.5%), 57 (28.2%),  
42 (20.8%),  
37 (19.7%),  
32 (16.3%),  
31 (15.7%), 30  
(14.9%), 22 (11.3%)  
(Table 2).

연구 결과

140 (70.0%)

1. 대상자의 특성

Table 2. Diseases Related Characteristics of Patients (N=202)

202  
118 (58.4%), 84 (41.6%)  
60 106 (52.5%)

Table 1. General Characteristics of Patients (N=202)

Characteristics	Classification	n	%
Gender	Men	118	58.4
	Women	84	41.6
Age (yr)	0-19	7	3.4
	20-39	24	11.9
	40-59	65	32.2
	60 and over	106	52.5
Lesion	Left	57	28.2
	Right	72	35.7
	Others	73	36.1
Type of stroke	Infarction	101	50.0
	Hemorrhage	68	33.7
	Others	33	16.3
Paralysis	Quadriplegia	59	29.2
	Left	72	35.6
	Right	66	32.7
	None	5	2.5

Characteristics	Normal		Abnormal	
	n*	%	n*	%
Speech disorder	83	41.1	119	58.9
Oral stasis	133	65.9	69	34.1
Drooling	135	66.8	67	33.2
Facial symmetry	135	68.0	64	32.0
Liquid aspiration	139	68.8	63	31.2
Delayed swallowing	142	70.6	59	29.4
Cheek movement	136	70.5	57	29.5
Salivary drooling	145	71.8	57	28.2
Cough during swallowing	160	79.2	42	20.8
Palate function	151	80.3	37	19.7
Spontaneous cough	164	83.7	32	16.3
Lip opening	166	84.3	31	15.7
Cough after swallowing	172	85.1	30	14.9
Wet voice	173	88.7	22	11.3
Tracheostomy	175	86.6	27	13.4
Pneumonia history	169	84.1	32	15.9
Head control	196	97.0	6	3.0
Cheek sensitivity	178	93.7	12	6.3
Lip closing	189	96.4	7	3.6
Tongue movement	178	88.1	18	8.9
Laryngeal elevation	197	98.5	3	1.5
Salivary secretion	199	99.5	1	0.5
Jaw movement	180	92.8	14	7.2
Cough before swallowing	192	95.0	10	5.0
Swallow reflex	188	94.5	11	5.5
Nasal regurgitation	196	97.5	5	2.5

\*Missing responses excluded.

124 (61.7%),  
 (pharyngeal peristalsis) 67 (33.5%), 41  
 47 (23.4%) (Table 3). (20.3%) 78.1% 32 32  
 29 25 86.2%

2. 연하곤란 사정도구의 흡인 위험 예측 항목

CART model

12 7 (58.3%) (Figure 1).  
 161 48

Table 3. Characteristics Related to Videofluoroscopy (N=202)

Characteristics	Complete		Incomplete	
	n*	%	n*	%
Oral phase				
Labial closure	186	92.1	16	7.9
Rotatory lateral movement of tongue	171	84.7	31	15.3
Seal off the lateral sulcus	194	96.0	8	4.0
Food propelling posteriorly	154	76.6	47	23.4
Pharyngeal phase				
Swallowing reflex	60	30.0	140	70.0
Closure of velo-pharyngeal port	195	96.6	5	2.5
Pharyngeal peristalsis	133	65.5	67	33.5
Elevation of larynx	190	95.0	10	5.0
Closure of larynx	77	38.3	124	61.7

\*Missing responses excluded.

29.8% 52.1% 24 115 20.9%

24 17 47.0% 8 98 16.3% 16 34 5 4 5

Table 4

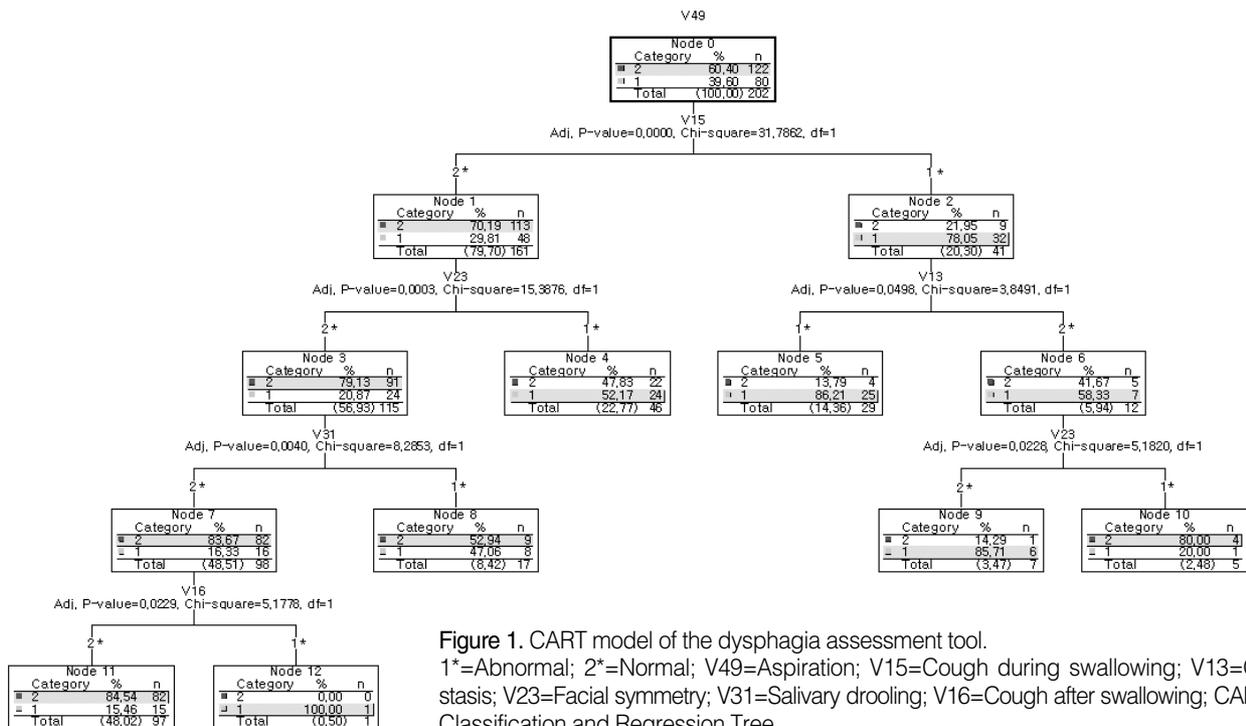


Figure 1. CART model of the dysphagia assessment tool. 1\*=Abnormal; 2\*=Normal; V49=Aspiration; V15=Cough during swallowing; V13=Oral stasis; V23=Facial symmetry; V31=Salivary drooling; V16=Cough after swallowing; CART=Classification and Regression Tree.

3. 수정된 연하곤란 사정도구와 비디오 연하영상 조영술의 흡인 위험 예측 오류 비교

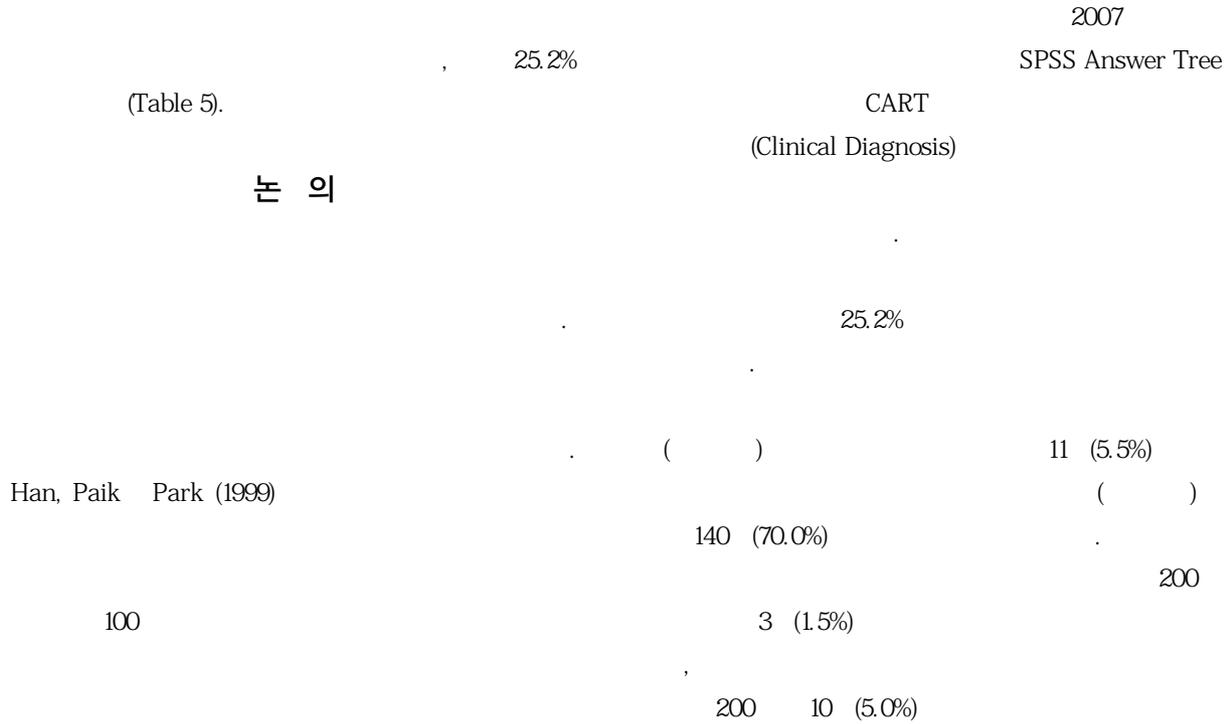


Table 4. Revised Dysphagia Assessment Tool

General characteristics	Classification		
Gender	M	F	
Age (yr)			
Lesion	Left	Right	Others
Type of stroke	Infarction	Hemorrhage	Others
Characteristics related to disease	Normal	Abnormal	
Cough during swallowing			
Oral stasis			
Facial symmetry			
Salivary drooling			
Cough after swallowing			

decision tree  
34

Table 5. Comparison of Risk Estimate Error of Aspiration in Revised Dysphagia Assessment Tool and Videofluoroscopy (N=202)

Expected value	Misclassification matrix							
		Revised dysphagia assessment tool			Videofluoroscopy			
			Actual value	Total	Actual value	Total		
Normal	Normal	95	24	119	Normal	118	47	165
Abnormal	Abnormal	27	56	83	Abnormal	4	33	37
	Total	122	80	202	Total	122	80	202
Risk estimate		Risk statistics			Risk statistics			
SE of risk estimate		.25			.25			
		.03			.03			

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Han, Paik Park (2001)

(Paek et al., 2007)

Daniel, Ballo Mahoney (2000) 56

6

6 2

6 (Risk esti-

5 mate error) 25.2%

5

25.2%

Ramsey, Smithard Kalar

(2003) Ramsey

(2003)

(silent aspiration)

5

1

202

80 39.6%

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