심폐재활

발표일시 및 장소: **10 월 19 일(토) 10:40-10:50 Room B(5F)**

OP2-3-5

Swallowing Exam of Water-soluble Contrast Improves Aspiration Sensitivity and Antedates Oral Feeding

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Purpose

Aspiration pneumonia increases medical comorbidities and social costs. An earlier and more reliable diagnosis of aspiration can allow earlier intervention to prevent this. Although the modified barium swallowing study (MBSS) is considered the gold standard for assessing aspiration risk, aspiration of lipid-soluble barium can cause chemical pneumonitis or impair radiologic interpretation of the lungs. Water soluble contrast agents (WSCAs) have been used through intravascular or intrathecal administration for computerized tomography or angiography. Its water-solubility may contribute more to avoidance of these complications, while maintaining sensitivity on aspiration, rather than does lipid-solubility of barium. To gain feasibility of WSCA application in clinical situations, authors introduced a WSCA in video-fluoroscopic swallowing study (VFSS).

Materials and method

This observational, non-randomized case-control cohort trial evaluated all patients who were >3 years old and were referred for VFSS from September 2015 to November 2017 at a tertiary medical center/university teaching hospital. Repeated evaluations of the same individuals were excluded. High-risk patients were evaluated by WSCA (iohexol)-based swallowing study (WSS) and non-high-risk patients were by MBSS. Demographic information, contributing factors, and length of hospital stay were collected. As for interval change, chest radiography, feeding methods, penetration aspiration scale, allergic/drug-toxic response, and symptom, signs related with chemical pneumonitis were compared.

Result

The study included 829 evaluations of 762 patients. After excluding 74 studies, 365 WSSs and 390 MBSSs were included (Figure 1). The most frequent underlying condition was brain lesion, followed by aspiration pneumonia. The elderly and presence of tracheostomy were more common in WSS. Aspiration was assessed more frequently in WSS (147 patients: 40.3%) than did in MBSS (36 patients: 9.2%) ($p = 0.00$). Nevertheless, neither aspiration volume (6.72 cc [3.09 - 10.35] vs. 5.53 cc [2.21 - 8.85]) nor radiographic alterations differed between the two groups (Table 1). Moreover, the swallowed (16.62 cc [8.45 - 24.79]) and aspirated amounts of iohexol were not correlated with radiologic changes or deterioration (Table 2). Switching to oral feeding following WSS was more frequent (164 patients: 44.9%)

than did (39 patients: 10.0%) after MBSS, whereas aspiration pneumonia was not (p = 0.00). WSS did not prolong the hospital stay until patient discharge or induce an allergic reaction or drug toxicity over 1 week (Table 1).

Conclusion

The absence of aspiration-induced complications and adverse allergic/drug-toxic effects suggests that, compared with MBSS, WSS may increase aspiration sensitivity and early switching to oral feeding. So, it may be deserved a swallowing study of choice for the high-risk patients.

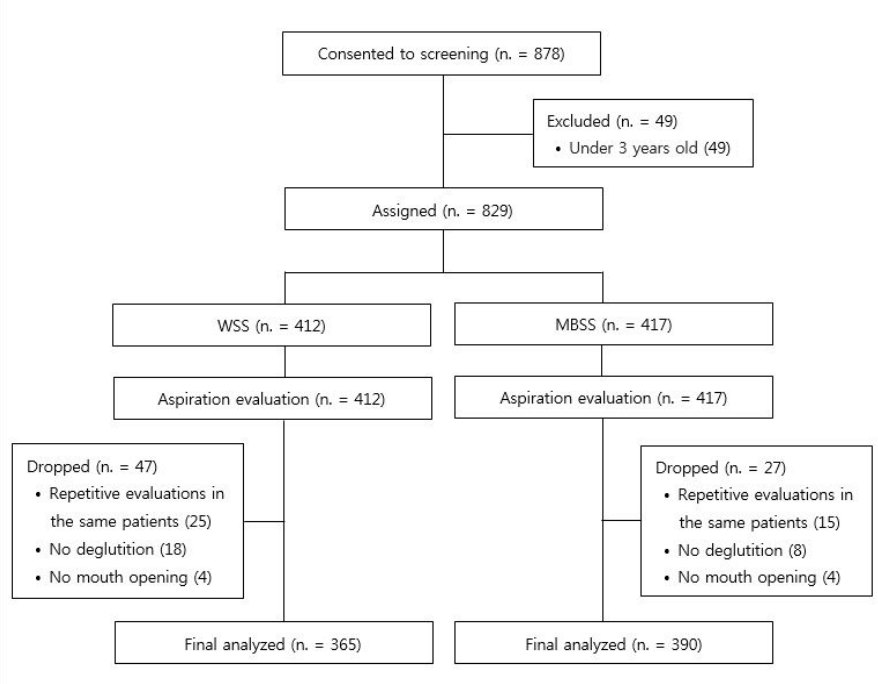

Figure1. Flow diagram: WSS, water-soluble contrast agent-based swallowing study; MBSS, modified barium swallowing study

Table1. Clinical features of swallowing study with water-soluble and lipid-soluble agents: Sx, symptom; Sg, sign; CI, confidence interval; †Chi-square tests, ‡ Fisher's exact tests, *Two sample independent t-tests

			Iohexol (n=365) n. (%)	Barium (n=390) n. (%)	*p-value*
Penetration-aspiration scale during evaluation †	Normal (I)		146 (40.0)	280 (71.8)	0.00
	To vocal folds (II - V)		72 (19.7)	74 (19.0)	
	Below vocal folds (VI – VIII)		147 (40.3)	36 (9.2)	
	radiographic examination after evaluation‡	improve-ment	20 (13.6)	8 (22.2)	0.07
		unchanged	88 (59.9)	8 (22.2)	
		worse	8 (5.4)	2 (5.6)	
	no radiographic examination after evaluation		31 (21.1)	18 (50.0)	
Sx and Sg of pneumonitis‡	Yes		8 (2.2)	2 (0.5)	0.06
	No		357 (97.8)	388 (99.5)	
Allergic reaction after evaluation‡	Yes		0 (0.0)	0 (0.0)	0.80
	No		365 (100.0)	390 (100.0)	
Dietary change after evaluation ‡	No changes		187 (51.3)	342 (87.7)	0.00
	To oral feeding		164 (44.9)	39 (10.0)	
	To tube feeding		14 (3.8)	9 (2.3)	
Oral feeding after evaluation†	Yes		266 (72.9)	369 (94.6)	0.00
	No		99 (27.1)	21 (5.4)	
Total hospital stay (day)* Mean (CI)			48.2 (11.3 -85.1)	37.7 (16.2-59.2)	0.00
Days from evaluation to discharge* Mean (CI)			19.5 (3.0-36.0)	14.9 (2.2-27.6)	0.06

Table2. Correlation of contrast agents with radiologic alterations after swallowing study: CI, confidence interval; Two sample independent t-tests or Spearman correlation analysis

		Mean (CI)	Radiologic changes (three components) *r* (*p*-value)	Radiologic changes (worsening vs. unchanged and improvement) *r* (*p*-value)
Aspiration during evaluation with iohexol (n. = 147)	Swallowed iohexol, amount (cc)	16.62 (8.45-24.79)	-0.08 (0.38)	-0.02 (0.82)
	Aspirated iohexol, amount (cc)	6.72 (3.09-10.35)	0.01 (0.90)	-0.07 (0.46)
Aspiration during evaluation with barium (n. = 36)	Swallowed barium, amount (cc)	11.74 (4.12-19.36)	-0.04 (0.65)	-0.02 (0.92)
	Aspirated barium, amount (cc)	5.53 (2.21-8.85)	0.01 (0.79)	-0.04 (0.65)