



# JOURNAL READING

## CAN NON-SWALLOWING FUNCTION ASSESSMENT PREDICT NASOGASTRIC TUBE REMOVAL IN PATIENTS WITH POST STROKE DYSPHAGIA? A CLINICAL STUDY

**DISUSUN OLEH:**

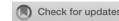
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## Can non-swallowing function assessment predict nasogastric tube removal in patients with poststroke dysphagia? A clinical study

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**Objective:** This study aimed to predict nasogastric tube (NGT) removal in patients with poststroke dysphagia (PSD) by non-swallowing function assessment.

**Methods:** We enrolled 232 eligible patients and performed rehabilitation. The Fugl-Meyer assessment motor (FMM) and National Institute of Health Stroke Scale (NIHSS) scores were used to measure the motor and overall nervous system functions. Predictors for NGT removal in patients with PSD after rehabilitation were analyzed.

**Results:** Of the 232 included patients, the NGTs were removed from 78% of them, while 22% were dependent on a feeding tube after 4 weeks of rehabilitation. Compared to the preserved NGT group, older age, a higher rate of intubation or tracheostomy, and more severe baseline functions were found in the NGT removal group. Age [odds ratio (OR) = 0.907; 95% confidence interval (CI): 0.859–0.957;  $p = 0.000$ ], difference in the FMM score after 4 weeks of rehabilitation (OR = 1.219; 95% CI: 1.145–1.299;  $p = 0.00$ ), and item 9 of NIHSS (OR = 0.488; 95% CI: 0.252–0.946;  $p = 0.034$ ) were predictors of NGT removal after rehabilitation.

**Conclusion:** We established a predictive model in patients with PSD using a non-swallowing assessment, which enabled us to predict swallowing recovery based on the non-swallowing function.

KEYWORDS

dysphagia, stroke, prognosis, functional improvement, NIHSS

01

# PENDAHULUAN

# PENDAHULUAN

Post Stroke Dysphagia (PSD)  
(42-80%)

Pulih secara **spontan** pada fase akut & 11-50% mengalami **disfagia dalam 6 bulan**

Rehabilitasi & pemulihan stroke

Pemberian makanan dengan **NGT** selama 2-3 mngg pertama stlh stroke

Nyaman, non-invasive, dan lebih mungkin menyebabkan refluks makanan, aspirasi, infeksi paru menetap jangka panjang

Pemberian makanan dengan **PEG** (*percutaneous gastrostomy*) → disfagia kronis

Komplikasi **3,8-10% pasien** → perdarahan, perforasi, dan peritonitis

Variabel prognostik pemulihan menelan stlh stroke akut

- Tanda-tanda aspirasi dalam 72 jam pertama
- Lokasi lesi
- Usia
- Komplikasi medis terkait stroke
- Fungsi kognitif
- Jenis stroke
- Skor National Institute of Health Stroke Scale (NIHSS)



# PENDAHULUAN

Pertimbangan rehabilitasi disfagia →  
intervensi efektif & mempersingkat  
durasi disfagia

Prognosis pemulihan pasien PSD

Pelepasan NGT menandakan →  
pemulihan menelan yang cukup →  
makan oral

## TUJUAN PENELITIAN

1. Evaluasi apakah perbaikan motorik berhubungan dengan pelepasan NGT pada pasien PSD
2. Memprediksi pelepasan NGT pada pasien PSD dengan non swallowing assessment



02

**METODE  
PENELITIAN**

# DESAIN PENELITIAN

01

## JENIS PENELITIAN

Studi analisis retrospektif

02

## LOKASI & WAKTU PENELITIAN

Departemen Neurologi, Pusat Rehabilitasi China pada **Januari 2012 – Desember 2021**

03

## INSTRUMEN PENELITIAN

- Data demografis dan klinis (rekam medis)
- Pengukuran skor NIHSS (National Institute of Health Stroke Scale)
- Pengukuran skor FMM (Fugl-Meyer Assessment Motor)

04

## DIAGNOSIS STROKE

Computed tomography atau MRI

# KRITERIA INKLUSI & KRITERIA EKSKLUSI

## KRITERIA INKLUSI

1. Usia 18-80 tahun
2. Riwayat stroke iskemik supratentorial pertama dalam 3 bulan
3. Riwayat PSD
4. Menggunakan NGT
5. Tidak ada riwayat pelatihan rehabilitasi menelan sebelumnya
6. Tidak terdapat penurunan kesadaran
7. Penilaian kemampuan fungsional saat masuk dan setelah 4 minggu rehabilitasi.

## KRITERIA EKSKLUSI

1. Lesi bilateral
2. Disfungsi jantung berat → Sindrom Koroner Akut, Infark Miokard, dan Gagal Jantung
3. Komplikasi serius yang mencegah rehabilitasi → Severe Pneumonia, Emboli Paru, Disfungsi Hepar, atau Dialisis Ginjal
4. Riwayat penyakit kanker, PPOK, malnutrisi, penyakit ginjal kronis, dan gangguan jiwa
5. Penyebab dasar sebelum stroke → Multiple Sclerosis, Penyakit Parkinson, Demensia, Penyakit Neuron Motorik, atau Operasi kepala atau leher sebelumnya
6. Intubasi endotrakeal atau trakeotomi
7. Telah lulus tes videofluoroskopi penilaian menelan (VFSS) pada minggu pertama setelah masuk



# ASSESSMENT

## PENILAIAN FUNGSI MENELAN & KRITERIA PELEPASAN NGT

Penilaian fungsi menelan → 24 jam setelah masuk dengan tes menelan air yang dimodifikasi

1. Pasien dengan posisi duduk, instruksikan minum 3 atau 5 ml air tanpa menggunakan pipet atau jeda.
2. Jmlh air scr bertahap ditingkatkan → 10, 30, dan 60 ml. Pada 60 ml, pasien minum secepat dan seaman mungkin.
3. Minum 3 atau 5 ml yogurt dengan sendok. Penambahan jumlah yogurt sama seperti minum air.

**GAGAL** → batuk, regurgitasi, gerakan laring, atau penurunan saturasi O<sub>2</sub> selama menelan atau 10 menit setelahnya

**BERHASIL** → VFSS / Videofluorographic Swallowing Study (gold standard disfagia)

## VFSS

(diberikan makanan yang dicampur barium → tampak radiopak)

### PARAMETER PENILAIAN VF :

1. Transportasi bolus dari mulut ke faring
2. Penahan bolus di rongga mulut
3. Velopharyngeal seal
4. Gerakan dasar lidah
5. Penyempitan faring
6. Elevasi laring
7. Pembukaan sfingter esofagus bagian atas
8. Stasis bolus di sinus pyriform

**Gejala** : Penutupan bibir yang terganggu, pembersihan mulut yang tidak lengkap, menelan sedikit demi sedikit berulang, pembersihan faring yang tidak lengkap, penetrasi, dan aspirasi

**GAGAL VFSS** →  
1/lebih gejala

# ASSESSMENT

## PENILAIAN FUNGSI MOTORIK & PENILAIAN FUNGSI KESELURUHAN

Fugl-Meyer Assessment Motor Score (FMM)

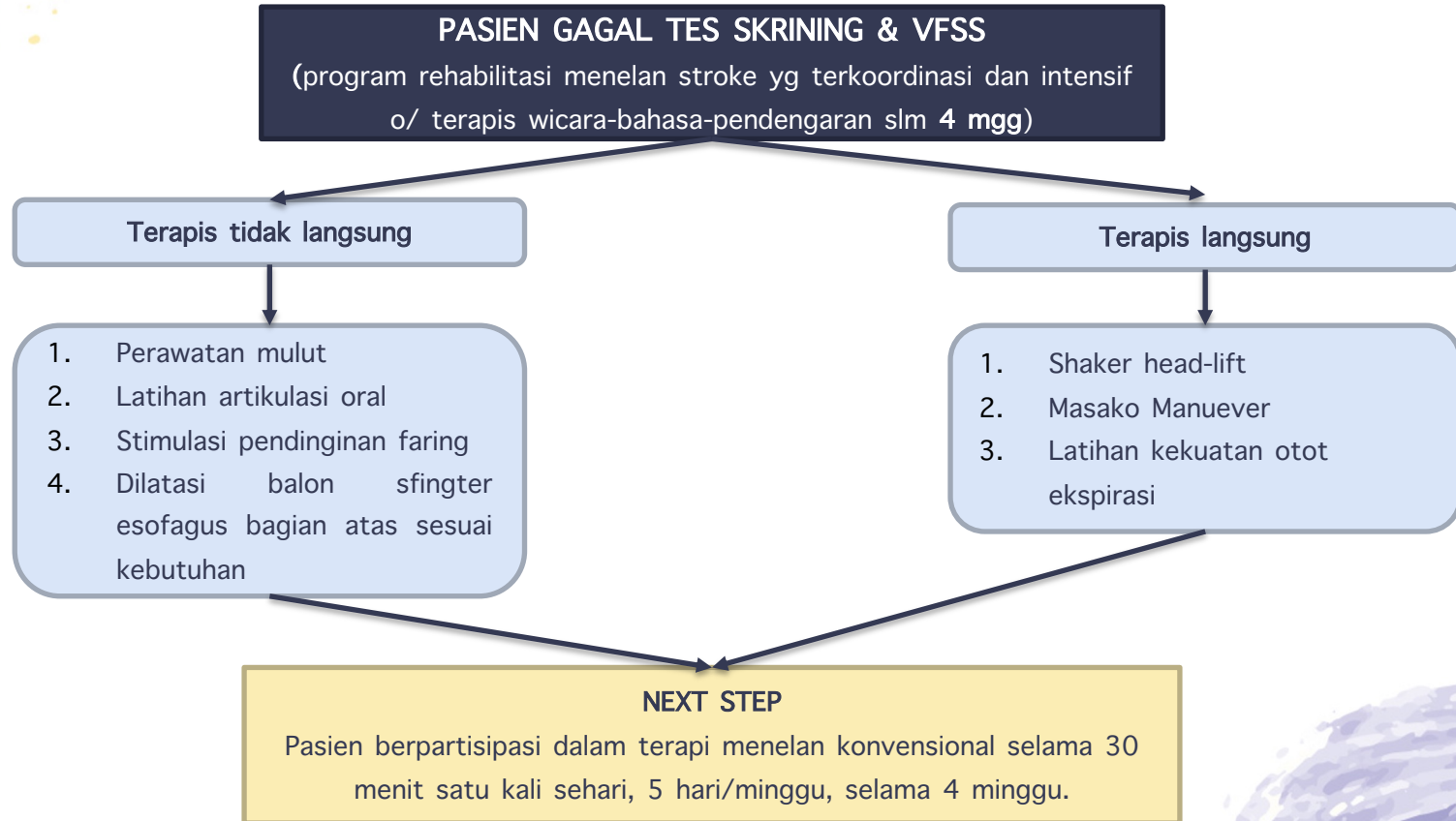
Gangguan motorik

NIHSS (National Institute of Health Stroke Scale)

Tingkat keparahan stroke & prediksi PSD dengan sensitivitas dan spesifisitas sedang

Skor FMM & NIHSS pasien PSD dinilai saat masuk & setelah 4 minggu rehabilitasi

# TREATMENT PROCEDURE



# ANALISIS STATISTIK

- **Analisis univariat** → membandingkan pasien dengan NGT dan tanpa melepas NGT
- Variabel kontinyu dinyatakan sebagai rata-rata  $\pm$  standar deviasi atau median
- **Tes Shapiro-Wilk** → normalitas distribusi data
- **Analisis bivariat** → perbedaan antara kelompok dianalisis dengan **Mann Whitney**
- **Analisis multivariat** → **Regresi Logistik** → identifikasi faktor resiko indenpenden
- Signifikansi  $p < 0,05$  dalam analisis bivariat → variabel dilakukan model analisis multivariat

03

HASIL  
PENELITIAN



# KARAKTERISTIK SUBJEK PENELITIAN

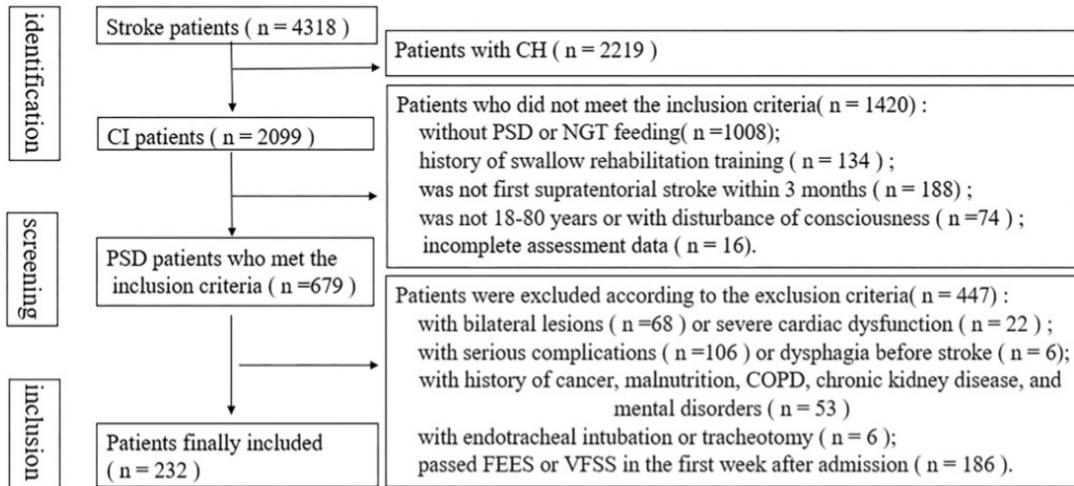


FIGURE 1

Flow diagram of the selection of patients from our cerebrovascular disease database and specific reasons for exclusion.

- Pasien stroke **4.318**
- Pasien CI → **2.099 pasien**
- Pasien yang memenuhi kriteria inklusi → **679 pasien**
- Total akhir pasien sesuai kriteria inklusi & eksklusi → **232 pasien**

# KARAKTERISTIK SUBJEK PENELITIAN

TABLE 1 Patients' characteristics.

Factors	Values (n = 232)
Removal of NGT	181 (78%)
Age, years	63.5 ± 10.7
Sex (men), n (%)	172 (74.1%)
<b>Past medical history</b>	
Hypertension, n (%)	169 (72.8%)
Diabetes mellitus, n (%)	95 (40.9%)
Dyslipidemia, n (%)	144 (62.1%)
Venous thrombosis, n (%)	55 (23.7%)
Coronary heart disease, n (%)	51 (22.0%)
Onset admission interval (OAI), days	28.8 ± 15.2
Stroke laterality (left), n (%)	122 (52.6%)
<b>Stroke location</b>	
Cortical branch of MCA	49 (21.1%)
Deep perforating branch of MCA	93 (40.1%)
MCA trunk	90 (38.8%)

## Stroke etiology

Large-artery atherosclerosis	149 (64.2%)
Cardioembolic	55 (23.7%)
Small-vessel occlusion	28 (12.1%)
Intubated or tracheostomy, n (%)	17 (7.3%)
Stroke severity (NIHSS) at admission	11.2 ± 4.6
FMM (admission)	24.8 ± 22.9
Pneumonia during rehabilitation, n (%)	47 (20.3%)

## Stroke outcome after 1 month

FMM (after 1 month)	45.2 ± 25.2
NIHSS score (after 1 month)	5.4 ± 2.2

NGT, nasogastric tube; MCA, middle cerebral artery; NIHSS, National Institute of Health Stroke Scale; FMM, Fugl-Meyer assessment motor score.

- Stlh 4 mgg rehabilitasi, **78%** dari 232 pasien PSD berhasil **melepas NGT**
- **Usia** → berada pada rentang usia 28-80 tahun, rata-rata **63.5 tahun**, dan median 65 tahun.
- **OAI** → 15-90 hari, **rata-rata 28.8 hari**, dan median 23,5 hari.
- Hemiplegia kanan → 52,6% pasien

TABLE 2 Risk factors for NGT removal in patients with PSD.

	NGT removed (N = 181)	NGT reserved (N = 51)	P-value
Age, years	61.7 ± 10.3	70.0 ± 9.6	0.000
Sex (men), n (%)	139 (76.8%)	33 (64.7%)	0.082
<b>Past medical history</b>			
Hypertension, n (%)	134 (74.0%)	35 (68.6%)	0.443
Diabetes mellitus, n (%)	70 (38.7%)	25 (49.0%)	0.184
Dyslipidemia, n (%)	115 (63.5%)	29 (56.9%)	0.386
Venous thrombosis, n (%)	40 (22.1%)	15 (29.4%)	0.278
Coronary heart disease, n (%)	41 (22.7%)	10 (19.6%)	0.643
Onset admission interval (OAI), days	28.5 ± 15.6	30.0 ± 13.8	0.523
Stroke laterality (left), n (%)	91 (50.3%)	31 (60.8%)	0.184
<b>Stroke location</b>			0.163
Cortical branch of MCA	38 (21.0%)	11 (21.6%)	
Deep perforating branch of MCA	78 (43.1%)	15 (29.4%)	
MCA trunk	65 (35.9%)	25 (49.0%)	
<b>Stroke etiology</b>			0.234
Large-artery atherosclerosis	112 (61.9%)	37 (72.5%)	
Cardioembolic	44 (24.3%)	11 (21.6%)	
Small-vessel occlusion	25 (13.8%)	3 (5.9%)	
Intubated or tracheostomy	8 (4.4%)	9 (17.6%)	0.001
<b>Function at admission</b>			
NIHSS at admission	10.6 ± 4.6	13.3 ± 4.0	0.000
FMM at admission	26.6 ± 23.2	18.4 ± 20.6	0.018
Pneumonia during rehabilitation	39 (21.5%)	8 (15.7%)	0.358
<b>Stroke outcome after 1 month</b>			
NIHSS score (after 1 month)	5.1 ± 2.2	6.4 ± 2.1	0.000
FMM (after 1 month)	51.1 ± 23.1	24.6 ± 20.9	0.000
<b>Functional improvements</b>			
FMM improvement after rehabilitation	24.5 ± 11.1	6.2 ± 7.6	0.000
NIHSS improvement after rehabilitation	5.5 ± 3.1	6.9 ± 2.7	0.003

# HASIL PENELITIAN

- Tidak ada perbedaan signifikan ( $p > 0.05$ ) dari 2 kelompok di variabel: Sex, Past Medical History, Stroke Location, Etiologi Stroke
- Terdapat perbedaan signifikan ( $p < 0.05$ ) pada kelompok di variabel **usia, fungsi motorik, fungsi sistem nervus keseluruhan, dan intubasi/trakeostomi**
- Setelah rehabilitasi, **fungsi motorik** dari 2 kelompok mengalami **perbaikan signifikan** pada kelompok **pelepasan NGT**.

# HASIL PENELITIAN

TABLE 3 Prediction Model 1—Multivariate analysis for NGT removal after rehabilitation in PSD patients with overall NIHSS.

Independent variables	OR (95% CI)	P值
Age, years	0.904 (0.856–0.955)	0.000
FMM improvement after rehabilitation	1.241 (1.162–1.326)	0.000
NIHSS improvement after rehabilitation	0.714 (0.590–0.865)	0.001
Intubated or tracheostomy	4.516 (0.531–38.373)	0.167

PSD, poststroke dysphagia; NGT, nasogastric tube; NIHSS, National Institute of Health Stroke Scale; FMM, Fugl-Meyer assessment motor score.

Terdapat tiga faktor signifikan ( $p\text{-value} < 0.05$ ) yang memengaruhi pelepasan NGT setelah rehabilitasi pada pasien PSD :

1. Usia (nilai  $p$  0.000)
2. Perbaikan skor FMM setelah rehabilitasi (nilai  $p$  0.000)
3. Perbaikan skor NIHSS setelah rehabilitasi (nilai  $p$  0.001)

Pasien yang lebih tua dan perbaikan skor FMM & NIHSS yang tidak signifikan → tidak adanya perbaikan dalam fungsi sistem nervus secara keseluruhan

# HASIL PENELITIAN

TABLE 4 Risk factors of NIHSS subscores for removal of NGT in patients with PSD.

	NGT removed N = 181	NGT reserved N = 51	P-value Mann Whitney U test
1a Level of consciousness	0 (0-0)	0 (0-0)	1.000
1b Ask month and age	0 (0-2)	0 (0-2)	0.448
1c Blink eyes and squeeze hands	0 (0-2)	0 (0-2)	0.005
2 Horizontal extraocular movements	0 (0-2)	0 (0-2)	0.040
3 Visual fields	0 (0-2)	0 (0-2)	0.706
4 Facial palsy	0 (0-2)	0 (0-2)	0.460
5 Arm motor drift	1 (0-3)	2 (0-3)	0.485
6 Leg motor drift	3 (0-3)	3 (0-3)	0.175
7 Limb ataxia	0 (0-1)	0 (0-1)	0.242
8 Sensation	0 (0-2)	0 (0-2)	0.623
9 Language/Aphasia	0 (0-2)	1 (0-2)	0.000
10 Dysarthria	0 (0-1)	0 (0-1)	0.010
11 Extinction/Inattention	0 (0-2)	0 (0-2)	0.831

PSD, poststroke dysphagia; NIHSS, National Institute of Health Stroke Scale.

Hasil tabel menunjukkan adanya keterkaitan yang signifikan dari subskor NIHSS yaitu pada kelompok yang melepas NGT dengan menunjukkan skor perbaikan pada mata berkedip dan meremas tangan, gerakan ekstraokular horizontal, bahasa/afasia, dan disarthria yang diperoleh hasil *p-value* <0.05.



# HASIL PENELITIAN

TABLE 5 Prediction Model 2—Multivariate analysis for NGT removal after rehabilitation in PSD patients with NIHSS subscores.

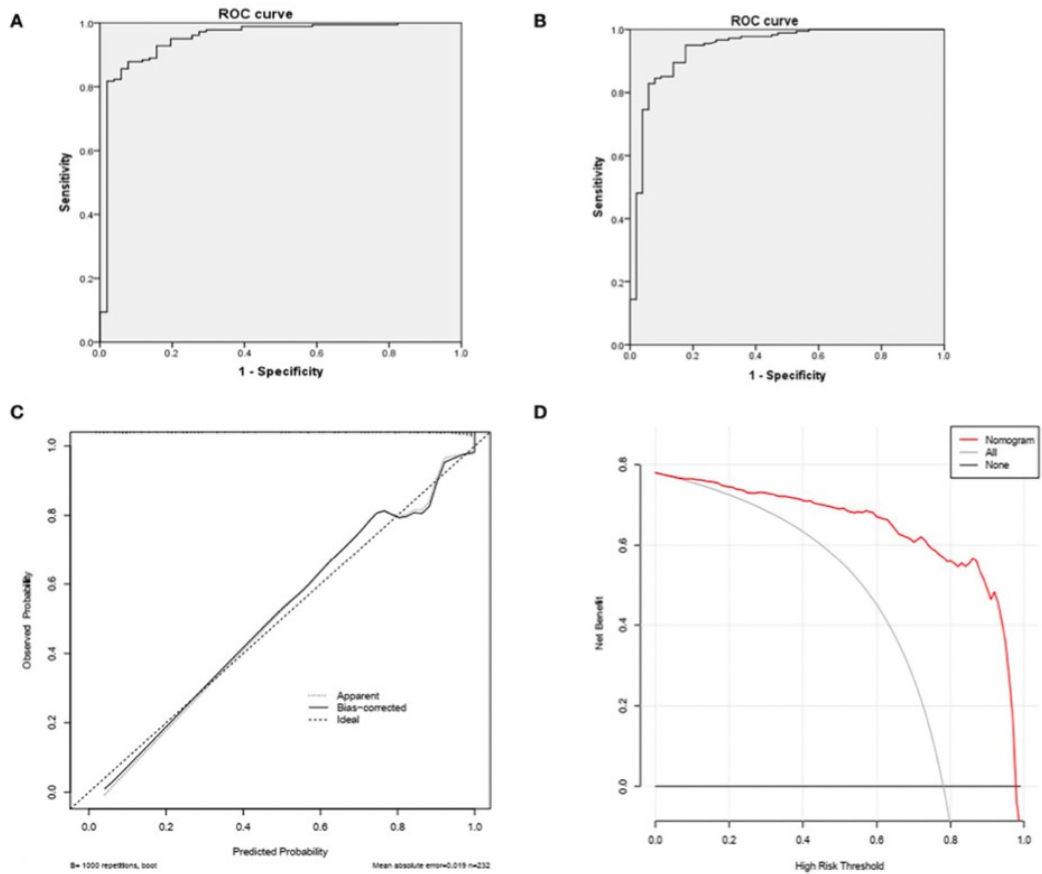
Independent variables	OR (95% CI)	P-value
Age, years	0.907 (0.859–0.957)	0.000
FMM improvement after rehabilitation	1.219 (1.145–1.299)	0.000
Intubated or tracheostomy	4.658 (0.529–41.023)	0.166
Item of NIHSS 1c improvement after rehabilitation	0.573 (0.092–3.569)	0.551
Item of NIHSS 2 improvement after rehabilitation	0.501 (0.121–2.072)	0.340
Item of NIHSS 9 improvement after rehabilitation	0.488 (0.252–0.946)	0.034
Item of NIHSS 10 improvement after rehabilitation	0.734 (0.201–2.682)	0.640

PSD, poststroke dysphagia; NGT, nasogastric tube; NIHSS, National Institute of Health Stroke Scale; FMM, Fugl-Meyer assessment motor score.

Berdasarkan prediction model 2, terdapat tiga faktor signifikan ( $p\text{-value} < 0.05$ ) yang memengaruhi pelepasan NGT setelah rehabilitasi pada pasien PSD :

1. Usia (nilai p 0.000)
2. Perbaikan skor FMM setelah rehabilitasi (nilai p 0.000)
3. Perbaikan skor NIHSS (item 9) setelah rehabilitasi (nilai p 0.034)

Pasien yang lebih tua, perbaikan motorik yang lebih sedikit, dan perbaikan bahasa yang lebih sedikit dapat menyebabkan peningkatan fungsi menelan yang terbatas setelah rehabilitasi.



**FIGURE 2**  
**(A)** The area under ROC curve of Model 1 was 0.950. The sensitivity was 95.0% and the specificity was 82.4%. **(B)** The area under the ROC curve of Model 2 was 0.941. The sensitivity was 92.8% and the specificity was 84.3%. **(C)** The Bootstrap method, repeated sampling 1000 times, was used for validation, and the C-index value was 0.94. **(D)** In the range of 0.01–1, the net benefit rate of the model 2 that predicts NGT removal in PSD patients is  $> 0$ .

Kurva karakteristik ROC → untuk mengetahui sensitivitas & spesifisitas. Dilakukan pengulangan pengambilan sampel 1.000 kali

- Kurva ROC model 1 → sensitivitas 95% dan spesifisitas 82,4%
- Kurva ROC model 2 → sensitivitas 92,8% dan spesifisitas 84,3%

04

**DISKUSI**

# DISKUSI

- Terdapat **korelasi signifikan antara usia dan pelepasan NGT** pada penelitian ini
- Semakin meningkatnya usia, maka akan terjadi perubahan seperti melemahnya kontraksi otot faring, daya tahan otot menelan yang memburuk, dan atrofi otot → menyebabkan disfagia
- Peningkatan fungsi motorik berkaitan dengan pelepasan NGT
- Dibandingkan dengan fungsi motorik awal, perbaikan motorik lebih praktis secara klinis karena pasien yang dirawat untuk rehabilitasi berada dalam tahap stroke yang berbeda, dan kebanyakan dari mereka tidak berada dalam keadaan onset stroke.
- **NIHSS** → alat penilaian semikuantitatif yang sistematis untuk **defisit neurologis terkait stroke**, telah diterapkan untuk **memprediksi secara dini prognosis PSD pada stadium akut**

# DISKUSI

- Perbaiki NIHSS pada pasien PSD berkaitan dengan pelepasan NGT → peningkatan fungsi motorik dan keseluruhan → meningkatkan plasitias otak → pasien mempelajari kembali cara menelan
- Item 4 NIHSS (kelumpuhan wajah dan kontrol motorik rongga mulut) → fungsi fase oral dlm menelan → tidak dapat memprediksi hasil PSD
- Item 9 NIHSS (bahasa/afasia) pada penelitian → untuk prediksi pemulihan menelan pada tahap subakut setelah rehabilitasi
- Subitem NIHSS → **hanya disartria berat yang muncul & berpengaruh signifikan terjadinya prolonged disfagia**



05

KETERBATASAN  
PENELITIAN

# KETERBATASAN PENELITIAN

1. **Penelitian hanya dilakukan di satu institusi** → jumlah pasien yang relative besar dan data pasien yang rehabilitasi rawat inap besar secara nasional
2. **Tingkat keparahan disfagia saat masuk tempat penelitian tidak dinilai** → konfirmasi disfagia sedang-berat pasien PSD dilakukan dengan tes skrining menelan
3. Hasil terbatas pada lokasi lesi supratentorial unilateral sehingga temuan penelitian kurang banyak yang digunakan

06

**PENILAIAN JURNAL**

# ANALISIS PICO

- **POPULASI** : Pasien PSD yang menggunakan NGT, memiliki riwayat stroke iskemik supratentorial pertama dalam 3 bulan yang berada pada rentang usia 18-80 tahun,
- **INTERVENSI** : Pasien diminta untuk duduk & diinstruksikan minum 3 atau 5 ml air secara bertahap, kemudian jumlah air ditingkatkan secara bertahap (10, 30,60 ml). Selanjutnya, pasien minum 3 atau 5 ml yogurt. Jika **Berhasil** → VFSS.
- **COMPARASION** : Pembagian dua kelompok yakni pasien PSD dengan NGT sebesar 51 pasien dan pasien PSD tanpa NGT sebesar 181 pasien
- **OUTCOMES** :
  - ✓ Stlh 4 mgg rehabilitasi, **78%** dari 232 pasien PSD berhasil **melepas NGT**
  - ✓ Terdapat tiga faktor signifikan (*p-value* <0.05) yang memengaruhi pelepasan NGT setelah rehabilitasi pada pasien PSD :  
Usia, Perbaikan skor FMM setelah rehabilitasi, Perbaikan skor NIHSS terutama item 9 setelah rehabilitasi

# JBICRITICAL APPRAISAL CHECKLIST FOR COHORT STUDIES

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

- |   | Yes                              | No                       | Unclear                          | Not applicable           |
|---|----------------------------------|--------------------------|----------------------------------|--------------------------|
| 1. Were the two groups similar and recruited from the same population?  | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 2. Were the exposures measured similarly to assign people to both exposed and unexposed groups?               | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 3. Was the exposure measured in a valid and reliable way?   | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 4. Were confounding factors identified?   | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 5. Were strategies to deal with confounding factors stated?   | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 6. Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)? | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 7. Were the outcomes measured in a valid and reliable way?  | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |
| 8. Was the follow up time reported and sufficient to be long enough for outcomes to occur?                    | <input type="checkbox"/>         | <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> |
| 9. Was follow up complete, and if not, were the reasons to loss to follow up described and explored?          | <input type="checkbox"/>         | <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> |
| 10. Were strategies to address incomplete follow up utilized?   | <input type="checkbox"/>         | <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> |
| 11. Was appropriate statistical analysis used?  | <input checked="" type="radio"/> | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/> |

Overall appraisal:  Include  Exclude  Seek further info

Comments (Including reason for exclusion)

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# JBICRITICAL APPRAISAL

Reviewer : Rr. Ariesna Muharany

Tanggal: 20-03-2023

Penulis : Bingjie Li, Tong Zhang, Jun Zhao,  
Pengkun Li, Zhangwei Wu, dan Shengjie Zhao

Tahun : 2023



07

# KESIMPULAN

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- Peningkatan usia, motorik dan fungsi keseluruhan, dan adanya gangguan berbicara berhubungan dengan pelepasan NGT pada pasien dengan PSD setelah 4 minggu rehabilitasi
- Pasien dengan pemulihan fungsi motorik yang cepat setelah rehabilitasi & melewati VFSS dapat melepas NGT (fungsi menelan sudah baik)
- Rehabilitasi bersifat spesifik untuk pasien, dengan terapi disfagia yang berhasil, belum tentu memberikan hasil yang sama pada populasi lain.
- Program rehabilitasi menelan harus disesuaikan dengan pemulihan motorik agar dapat mengikuti & mengelola program rehabilitasi menelan dengan baik.

# REFERENSI

1. Cohen DL, Roffe C, Beavan J, Blackett B, Fairfield CA, Hamdy S, et al. Post- stroke dysphagia: a review and design considerations for future trials. *Int J Stroke*. (2016) 11:399–411. doi: 10.1177/1747493016639057
2. Jones CA, Colletti CM, Ding MC. Post-stroke dysphagia: recent insights and unanswered questions. *Curr Neurol Neurosci Rep*. (2020) 20:61. doi: 10.1007/s11910-020-01081-z
3. Dziewas R, Michou E, Trapl-Grundschober M, Lal A, Arsava EM, Bath PM, et al. European stroke organisation and European society for swallowing disorders guideline for the diagnosis and treatment of post-stroke dysphagia. *Eur Stroke J*. (2021) 6:LXXXIX-CXV. doi: 10.1177/23969873211039721
4. Winstein CJ, Stein J, Arena R, Bates B, Cherney LR, Cramer SC, et al. Guidelines for adult stroke rehabilitation and recovery: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. (2016) 47:e98–169. doi: 10.1161/STR.000000000000098
5. Crisan D, Shaban A, Boehme A, Dubin P, Juengling J, Schluter LA, et al. Predictors of recovery of functional swallow after gastrostomy tube placement for dysphagia in stroke patients after inpatient rehabilitation: a pilot study. *Ann Rehabil Med*. (2014) 38:467–75. doi: 10.5535/arm.2014.38.4.467
6. Dietrich CG, Schoppmeyer K. Percutaneous endoscopic gastrostomy - Too often? too late? Who are the right patients for gastrostomy? *World J Gastroenterol*. (2020) 26:2464–71. doi: 10.3748/wjg.v26.i20.2464
7. Brown K, Cai C, Barreto A, Shoemaker P, Woellner J, Vu K, et al. Predictors of percutaneous endoscopic gastrostomy placement in acute ischemic stroke. *J Stroke Cerebrovasc Dis*. (2018) 27:3200–7. doi: 10.1016/j.jstrokecerebrovasdis.2018.07.022
8. Ickenstein GW, Kelly PJ, Furie KL, Ambrosi D, Rallis N, Goldstein R, et al. Predictors of feeding gastrostomy tube removal in stroke patients with dysphagia. *J Stroke Cerebrovasc Dis*. (2003) 12:169–74. doi: 10.1016/S1052-3057(03)00077-6
9. Lin YN, Chen SY, Wang TG, Chang YC, Chie WC, Lien IN. Findings of videofluoroscopic swallowing studies are associated with tube feeding dependency at discharge in stroke patients with dysphagia. *Dysphagia*. (2005) 20:23– 31. doi: 10.1007/s00455-004-0021-6
10. Kim H, Lee HJ, Park JW. Clinical course and outcome in patients with severe dysphagia after lateral medullary syndrome. *Ther Adv Neurol Disord*. (2018) 11:1756286418759864. doi: 10.1177/1756286418759864
11. Ickenstein GW, Höhlig C, Prosiel M, Koch H, Dziewas R, Bodechtel U, et al. Prediction of outcome in neurogenic oropharyngeal dysphagia within 72 hours of acute stroke. *J Stroke Cerebrovasc Dis*. (2012) 21:569– 76. doi: 10.1016/j.jstrokecerebrovasdis.2011.01.004
12. Kumar S, Doughty C, Doros G, Selim M, Lahoti S, Gokhale S, et al. Recovery of swallowing after dysphagic stroke: an analysis of prognostic factors. *J Stroke Cerebrovasc Dis*. (2014) 23:56–62. doi: 10.1016/j.jstrokecerebrovasdis.2012.09.005

# REFERENSI

13. Roje-Bedekovic' M, Dimitrovic' A, Breitenfeld T, Supanc V, Vargek Solter V. Reliable predicting factors for post-stroke dysphagia – our experience. *Neurol Psychiatry Brain Res.* (2020) 38:97–101. doi: 10.1016/j.npbr.2020.10.006
14. Hota S, Inamoto Y, Oguchi K, Kondo T, Otaka E, Mukaino M, et al. Outcomes of dysphagia following stroke: factors influencing oral intake at 6 months after onset. *J Stroke Cerebrovasc Dis.* (2021) 30:105971. doi: 10.1016/j.jstrokecerebrovasdis.2021.105971
15. Calvo I, Pizzorni N, Gilardone G, Mayer F, Vanacore N, Buraschi V, et al. Predictors of oral feeding resumption after stroke in a rehabilitation hospital: a retrospective study. *J Stroke Cerebrovasc Dis.* (2019) 28:1958– 70. doi: 10.1016/j.jstrokecerebrovasdis.2019.03.040
16. Oguchi N, Yamamoto S, Terashima S, Arai R, Sato M, Ikegami S, et al. The modified water swallowing test score is the best predictor of postoperative pneumonia following extubation in cardiovascular surgery: a retrospective cohort study. *Medicine.* (2021) 100:e24478. doi: 10.1097/MD.00000000000024478
17. Labeit B, Mueller H, Muhle P, Claus I, Warnecke T, Dziewas R, et al. Predicting dysphagia with National Institute of Health stroke scale: distinction between infra- and supratentorial region is essential. *Cerebrovasc Dis.* (2018) 46:152–60. doi: 10.1159/000493371
18. Lee WH, Lim MH, Seo HG, Seong MY, Oh BM, Kim S. Development of a novel prognostic model to predict 6-month swallowing recovery after ischemic stroke. *Stroke.* (2020) 51:440–8. doi: 10.1161/STROKEAHA.119.027439
19. Xi X, Li H, Wang L, Yin X, Zeng J, Song Y, et al. How demographic and clinical characteristics contribute to the recovery of post-stroke dysphagia? *Medicine.* (2021) 100:e24477. doi: 10.1097/MD.00000000000024477
20. Wilmskoetter J, Bonilha L, Martin-Harris B, Elm JJ, Horn J, Bonilha HS. Factors influencing oral intake improvement and feeding tube dependency in patients with poststroke dysphagia. *J Stroke Cerebrovasc Dis.* (2019) 28:1421– 30. doi: 10.1016/j.jstrokecerebrovasdis.2019.03.031
21. Nakadate A, Otaka Y, Kondo K, Yamamoto R, Matsuura D, Honaga K, et al. Age, body mass index, and white blood cell count predict the resumption of oral intake in subacute stroke patients. *J Stroke Cerebrovasc Dis.* (2016) 25:2801– 8. doi: 10.1016/j.jstrokecerebrovasdis.2016.07.038
22. Chen KC, Jeng Y, Wu WT, Wang TG, Han DS, Ozçakar L, et al. Sarcopenic dysphagia: a narrative review from diagnosis to intervention. *Nutrients.* (2021) 13:4043. doi: 10.3390/nu13114043
23. Sporns PB, Muhle P, Hanning U, Suntrup-Krueger S, Schwindt W, Eversmann J, et al. Atrophy of swallowing muscles is associated with severity of dysphagia and age in patients with acute stroke. *J Am Med Dir Assoc.* (2017) 18:635.e1–7. doi: 10.1016/j.jamda.2017.02.002
24. Martin RE. Neuroplasticity and swallowing. *Dysphagia.* (2009) 24:218– 29. doi: 10.1007/s00455-008-9193-9
25. Garavelli F, Ghelfi AM, Kilstein JG. Usefulness of NIHSS score as a predictor of non-neurological in-hospital complications in stroke. *Med Clin.* (2021) 157:434– 7. doi: 10.1016/j.medcli.2020.07.034

# REFERENSI

26. Alshekhlee A, Ranawat N, Syed TU, Conway D, Ahmad SA, Zaidat OO. National Institutes of Health stroke scale assists in predicting the need for percutaneous endoscopic gastrostomy tube placement in acute ischemic stroke. *J Stroke Cerebrovasc Dis.* (2010) 19:347–52. doi: 10.1016/j.jstrokecerebrovasdis.2009.07.014
27. Lin WC, Huang CY, Lee LF, Chen YW, Ho CH, Sun YT. Initial National Institute of Health stroke scale to early predict the improvement of swallowing in patients with acute ischemic stroke. *J Stroke Cerebrovasc Dis.* (2019) 28:104297. doi: 10.1016/j.jstrokecerebrovasdis.2019.07.013
28. Tadavarthi Y, Hosseini P, Reyes SE, Focht Garand KL, Pisegna JM, Pearson WG. Pilot study of quantitative methods for differentiating pharyngeal swallowing mechanics by dysphagia etiology. *Dysphagia.* (2021) 36:231– 41. doi: 10.1007/s00455-020-10123-0