2025 전임의 리더쉽 교육

AI를 내 품에

Ryoung-Eun Ko

Department of Critical Care Medicine
Samsung Medical Center

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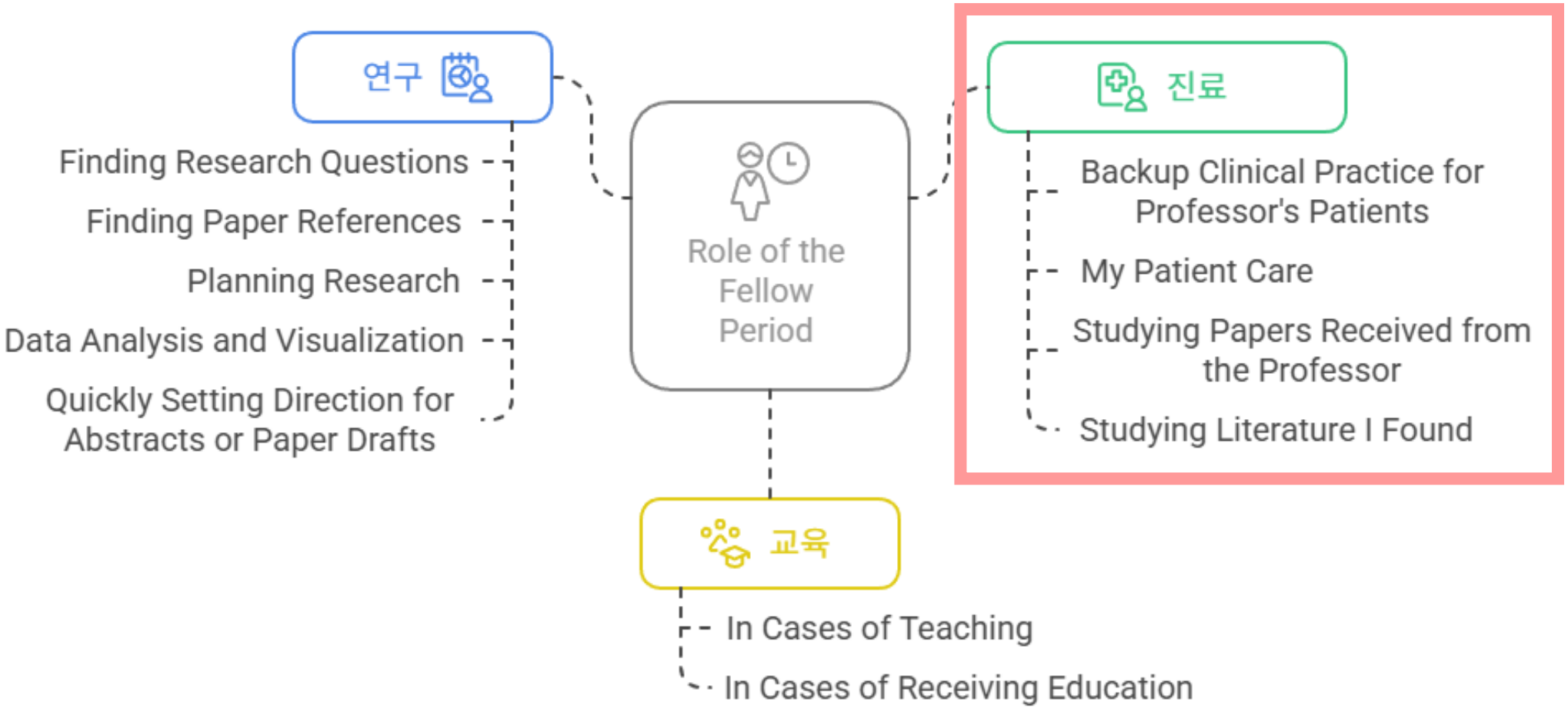
전임의 시기


연구
Finding Research Questions
Finding Paper References
Planning Research
Data Analysis and Visualization
Quickly Setting Direction for Abstracts or Paper Drafts
Role of the Fellow Period
진료
Backup Clinical Practice for Professor's Patients
My Patient Care
Studying Papers Received from the Professor
Studying Literature I Found
교육
In Cases of Teaching
In Cases of Receiving Education

논문 읽을 때

메뉴 rittayamai-et-al-2015... 만들기

모든 도구 편집 변환 전자 서명 텍스트 또는 도구 찾기

ORIGINAL ARTICLE

Evolution of Diaphragm Thickness during Mechanical Ventilation
Impact of Inspiratory Effort

Ewan C. Goligher[1,2,3,4], Eddy Fan[1,2,4,5], Margaret S. Herridge[1,2,4,6], Alistair Murray[1,4], Stefannie Vorona[1,4], Debbie Brace[1,4], Nuttapol Rittayamai[1,7], Ashley Lanys[1,4,7], George Tomlinson[2], Jeffrey M. Singh[1,2,4], Steffen-Sebastian Bolz[3], Gordon D. Rubenfeld[1,2,5,8], Brian P. Kavanagh[1,3,9,10], Laurent J. Brochard[1,2,7], and Niall D. Ferguson[1,2,3,4,5,6]

[1]Interdepartmental Division of Critical Care Medicine, [2]Department of Medicine, [3]Department of Physiology, [5]Institute for Health Policy, Management and Evaluation, and [9]Department of Anesthesia, University of Toronto, Toronto, Ontario, Canada; [4]Division of Respirology, Department of Medicine, University Health Network and Mount Sinai Hospital, Toronto, Ontario, Canada; [6]Toronto General Research Institute, Toronto, Ontario, Canada; [7]Keenan Centre for Biomedical Research, St. Michael's Hospital, Toronto, Ontario, Canada; [8]Department of Critical Care Medicine, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; and [10]Department of Critical Care Medicine, Hospital for Sick Children, Toronto, Ontario, Canada

Abstract

Rationale: Diaphragm atrophy and dysfunction have been reported in humans during mechanical ventilation, but the prevalence, causes, and functional impact of changes in diaphragm thickness during routine mechanical ventilation for critically ill patients are unknown.

Objectives: To describe the evolution of diaphragm thickness over time during mechanical ventilation, its impact on diaphragm function, and the influence of inspiratory effort on this phenomenon.

Methods: In three academic intensive care units, 107 patients were enrolled shortly after initiating ventilation along with 10 nonventilated intensive care unit patients (control subjects). Diaphragm thickness and contractile activity (quantified by the inspiratory thickening fraction) were measured daily by ultrasound.

Measurements and Main Results: Over the first week of ventilation, diaphragm thickness decreased by more than 10% in 47 (44%), was unchanged in 47 (44%), and increased by more than 10% in 13 (12%). Thickness did not vary over time following extubation or in nonventilated patients. Low diaphragm contractile activity was associated with rapid decreases in diaphragm thickness, whereas high contractile activity was associated with increases in diaphragm thickness ($P = 0.002$). Contractile activity decreased with increasing ventilator driving pressure ($P = 0.01$) and controlled ventilator modes ($P = 0.02$). Maximal thickening fraction (a measure of diaphragm function) was lower in patients with decreased or increased diaphragm thickness (n = 10) compared with patients with unchanged thickness (n = 10; $P = 0.05$ for comparison).

Conclusions: Changes in diaphragm thickness are common during mechanical ventilation and may be associated with diaphragmatic weakness. Titrating ventilatory support to maintain normal levels of inspiratory effort may prevent changes in diaphragm configuration associated with mechanical ventilation.

Keywords: artificial respiration; weaning; diaphragm function; disuse atrophy; myotrauma

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Author Contributions: E.C.G. and N.D.F. conceived and designed the study. E.F., M.S.H., L.J.B., G.T., G.D.R., B.P.K., S.-S.B., and J.M.S. made substantial contributions to the design and analysis plan of the study. A.M., S.V., D.B., N.R., A.L., and E.C.G. collected the data. E.C.G. and G.T. conducted the data analysis. E.C.G., E.F., G.T., G.D.R., B.P.K., S.-S.B., J.M.S., M.S.H., L.J.B., and N.D.F. contributed to the interpretation of the analysis results. E.C.G. prepared the first draft of the manuscript, and all authors revised the draft critically for important intellectual content. All authors gave final approval of the manuscript version to be published.

Correspondence and requests for reprints should be addressed to Niall D. Ferguson, M.D., M.Sc., Toronto General Hospital, 585 University Avenue, 11-PMB-120, Toronto, ON, M5G 2N2 Canada. E-mail: n.ferguson@utoronto.ca

This article has an online supplement, which is accessible from this issue's table of contents at www.atsjournals.org

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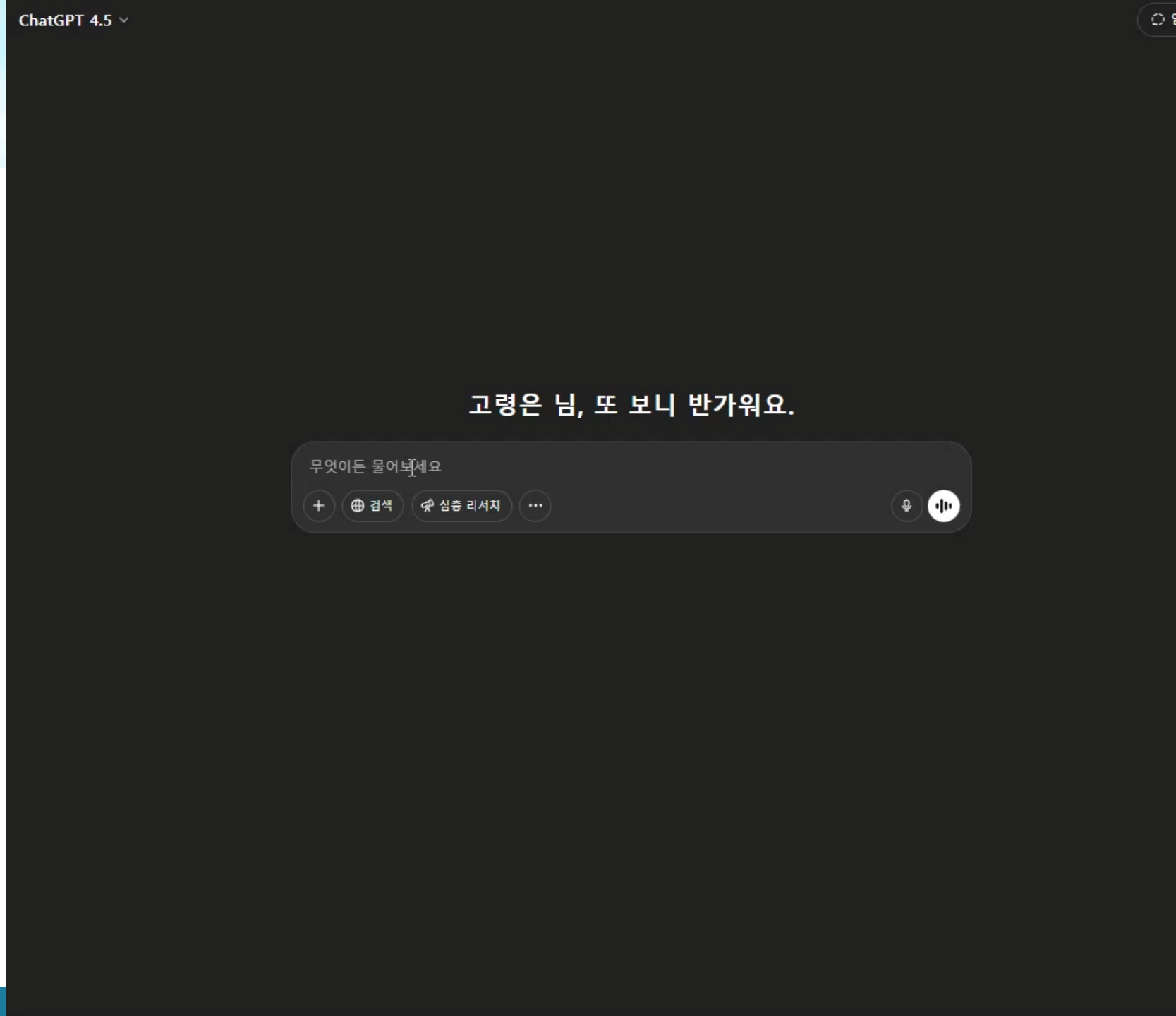
논문 읽을 때

진료 중 궁금증



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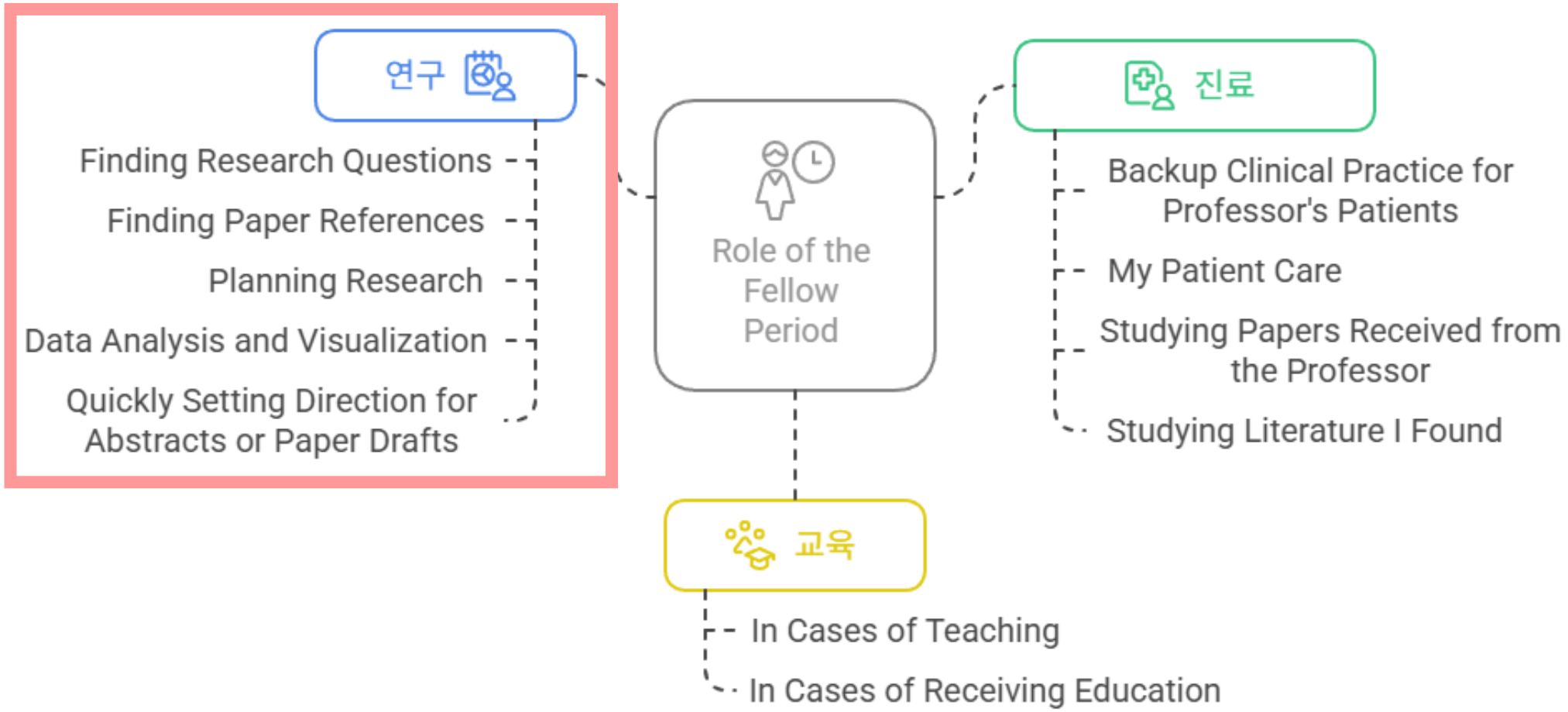
Journal	Year	Author	Design	patients	key point	risk factor for delirium	
Canadian Journal of Cardiology	2020	Etsuo et al.	Retrospective 2014-2017	AHF (n=408)	delirium is an independent predictor of in-hospital and long term mortality	age nursing home dementia	cardiovascular marker는 관계 없다
Circulation	2020	Christopher B et al	AHA scientific statement		critically ill patients와 비슷 CCU엔 intu 환자가 많아 비슷한 특성		
Resuscitation	2020	Hanneke et al	post hoc analysis of prospective cohort	post CPR comatous patients (n=141)	delirium 많이 생긴다. EEG 가 도움을 준다.		delirium 있으면 poor neurologic outcome
EHJ ACC	2017	Koji et al	Retrospective 2012-2013	non-intubated over 48h stay in CICU (n=163)	Delirium 환자 mortality 높다	dementia cerebrovascular disease SOFA	cardiovascular marker는 영향이 없다. (discussion +)
Critical Care Medicine	2013	John A et al	Prospective	medical-surgical cardiac unit (n=200)	hypoactive form이 많다.	physical restraint benzo previous mental status	
American Heart Journal	2021	Alejandro et al	Review				cardiac arrest / AHF 환자들 특성 강조
Heart failure reviews	2020	Michele	Review				HF 환자에서 delirium 발병 원인에 cardio problem을 다수 나열

전임의 시기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Finding Research Questions
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Quickly Setting Direction for Abstracts or Paper Drafts
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진료
Backup Clinical Practice for Professor's Patients
My Patient Care
Studying Papers Received from the Professor
Studying Literature I Found
교육
In Cases of Teaching
In Cases of Receiving Education

연구진행흐름

Research question

연구 질문을 명확히 하고 정의합니다.

Reference

연구에 대한 관련 논문을 찾습니다.

Study design

연구를 위한 구조화된 계획을 세웁니다.

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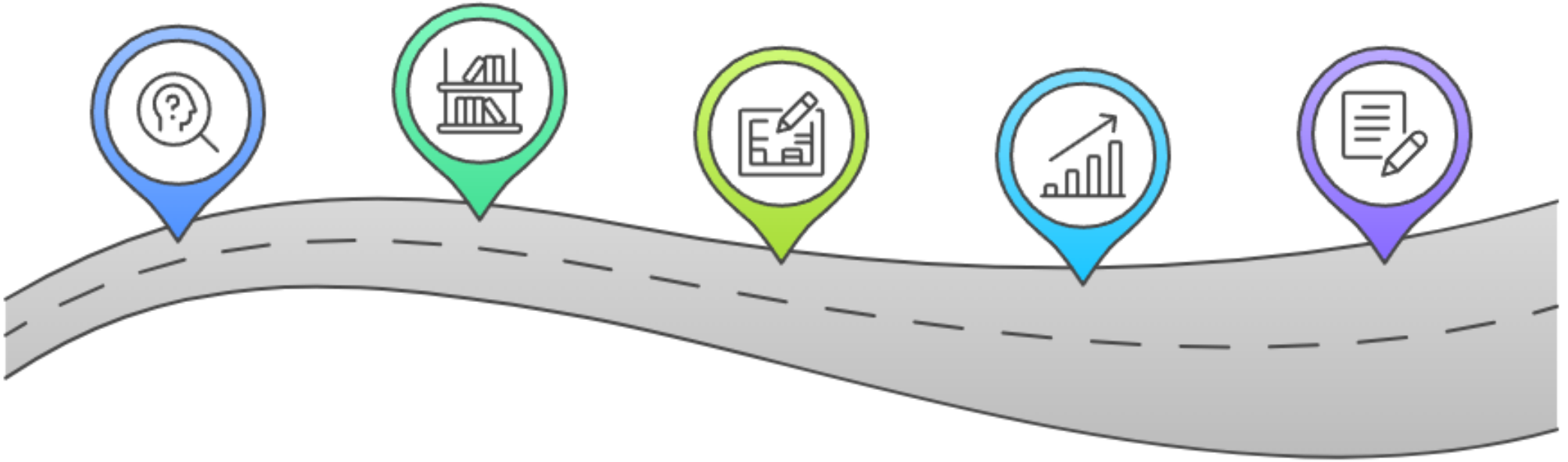

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ARDS and Right Ventricular Dysfunction	Review	2:26pm Apr 28
ARDS and Right Ventricular Dysfunction	Notebook	2:23pm Apr 28

MAY 7, 2025

How do different mechanical ventilation strategies affect diaphragm muscle strength and recovery in intensive care unit patients?

Mechanical ventilation strategies that encourage patient effort, such as assisted modes and early mobilization, better preserve diaphragm strength compared to controlled ventilation, which causes rapid muscle atrophy.

ABSTRACT

Mechanical ventilation strategies affect diaphragm structure and function in critically ill patients. ✳ In studies of adults ventilated for 24 to 48 hours or longer, controlled ventilation modes were associated with marked diaphragm atrophy. ✳ For example, one study noted a daily atrophy rate of 7.5% under controlled ventilation, contrasted with only 1.5% under low pressure support and an increase of 2.3% with spontaneous breathing/CPAP. ✳ Other investigations reported that diaphragm thickness declined from 1.84 ± 0.44 mm to 1.49 ± 0.37 mm during controlled ventilation but improved to 1.75 ± 0.43 mm after switching to assisted modes. ✳ Measures of muscle strength (e.g., maximal inspiratory pressure and thickening fraction) varied: some reports described decreased contractile activity with controlled ventilation while others noted improvements with higher patient effort, pressure support during spontaneous breathing trials, or early mobilization. ✳

Key quantitative findings include:

1. Daily diaphragm atrophy rates ranging from approximately –7.5% (controlled) to –1.5% (low pressure support) with a positive change (+2.3%) observed with spontaneous modes. ✳
2. Diaphragm thickness improvements during transition from controlled (≈1.49 mm) to assisted ventilation (≈1.75 mm). ✳
3. A significant correlation between diaphragm thinning during controlled ventilation and prolonged time to liberation (hazard ratio 0.69, 95% CI 0.54–0.87) as well as increased weaning failure. ✳
4. Early mobilization maintained higher diaphragm thickening fractions ($p < 0.01$) in patients with

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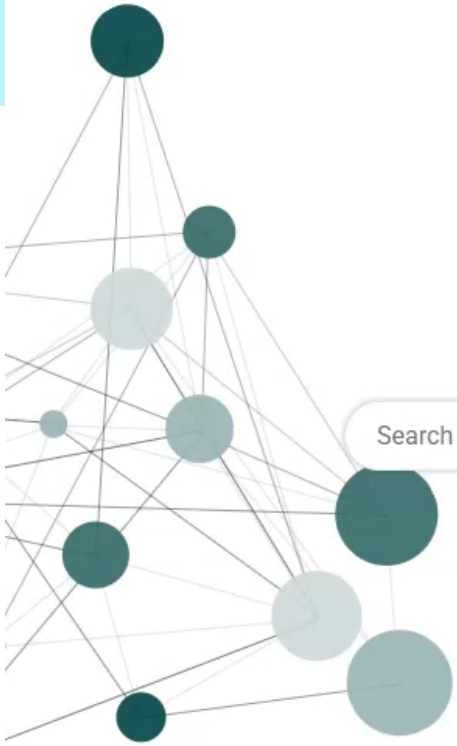

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고령은 님, 어서 와요. 시작할 준비 되셨나요?

무엇이든 물어보세요

검색 심층 리서치 이미지 그리기

ChatGPT
운영자
Sora
Academic Writing Pro
MediStat-Table1
GPT 탐색
라이브러리 16

프로젝트
새 프로젝트

오늘
HARP-2 RCT 결과
우심실 다루기 해석
논문 수정 요청 사항
P0.1 자동연동 필요성

어제
Metformin MALA와 산증
BM 결과 해석
AFOP 치료 방법

지난 7일
논문 발표 슬라이드 구성
슬라이드 구성 제안
데이터 분석 준비
기계환기와 횡격막 손상
기계환기와 횡격막 손상
PICO 분석 및 요약
PICO 분석 논문 요약
Sepsis Clustering 연구 참고
논문 리비전 도움

ChatGPT 맞춤 설정

자기소개를 하고 보다 내게 맞춰진 응답을 받으세요

ChatGPT가 어떻게 불러드리면 좋을까요?

고령은

어떤 일을 하고 계신가요?

삼성서울병원 중환자의학과 교수 (호흡기 내과 전문의)

ChatGPT가 어떤 특성을 지녔으면 하나요?

I want academic, scientific, and evidence-based answers and write accordingly.

+ 수다쟁이 + 재간둥이 + 빈말하지 않음 + 지지적 + Z세대
+ 회의적 + 관습 중시 + 미래지향적 + 문학적

ChatGPT가 당신에 대해 알아야 할 내용이 또 있을까요?

I am a pulmonologist-intensivist. I research acute respiratory failure and critical care medicine at a tertiary referral university hospital. I also do research on AL, so I use chat GPT for data management, machine learning, and deep learning. Therefore, I want academic, scientific, and evidence-based answers and write accordingly.

고급

ChatGPT 기능

웹 검색 DALL·E 코드 캔버스 고급 음성

새 채팅에 사용

취소 저장

내 GPT

+ 만들기

GPT

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검색

+ 만들기

홈

Shorts

구독

내 페이지

Doctor GPT

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구독중

홈 동영상 Shorts 재생목록

추천

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ChatGPT 4.5

임시

ChatGPT
운영자
Sora
라이브러리 13
Academic Writing Pro
MediStat-Table1
DALL·E
GPT 탐색

프로젝트
새 프로젝트

오늘
기계환기와 횡격막 손상
기계환기와 횡격막 손상
PICO 분석 및 요약
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Sepsis Clustering 연구 참고
논문 리비전 도움
우측심실 기능 저하 연구

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LVOT 직경 측정 시점
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ARDS 연구 디자인 요약
CIRCI 진단법 요약

지난 30일

고령은 님, 어서 와요. 시작할 준비 되셨나요?

무엇이든 물어보세요

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MediStat-Table1

공유하기

table 1을 다시 보여줘.

분석함

python 항상 세부 정보 표시 복사

```
# Display the previously computed Table 1 again
tools.display_dataframe_to_user(name="Table 1: Baseline Characteristics by Sex", dataframe=table1_
```

결과

	Variable	Group 1 (N = 394)	Group 2 (N = 206)	Total (N = 600)	p-value
0	ALC	0.9 ± 1.0	1.1 ± 1.9	1.0 ± 1.4	0.112
1	ALT	151.8 ± 629.4	130.3 ± 389.7	144.4 ± 558.7	0.611
2	ANC	10.4 ± 9.7	10.6 ± 9.0	10.5 ± 9.4	0.769
3	AST	286.6 ± 1960.2	294.7 ± 1033.5	289.4 ± 1700.2	0.948
4	Albumin	2.8 ± 0.5	2.8 ± 0.6	2.8 ± 0.5	0.388

Table 1: Baseline Characteristics By Sex

	Variable	Group 1 (N = 394)	Group 2 (N = 206)	Total (N = 600)
4	AST	286.6 ± 1960.2	294.7 ± 1033.5	289.4 ± 1700.2
5	Albumin	2.8 ± 0.5	2.8 ± 0.6	2.8 ± 0.5
6	BUN	31.9 ± 18.9	30.6 ± 19.9	31.4 ± 19.2
7	CRP	15.9 ± 10.7	13.8 ± 11.2	15.2 ± 10.9
8	CI	99.7 ± 6.9	99.5 ± 7.1	99.6 ± 7.0

Table 1을 다시 표시했습니다. 다른 그룹 변수로 분석하거나, 특정 변수에 대해 추가 통계 또는 그래프가 필요하신가요?

무엇이든 물어보세요

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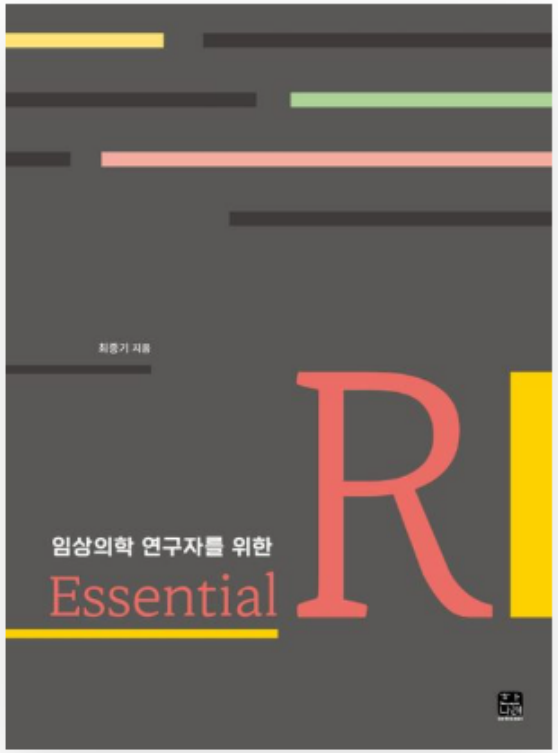

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구독

홈 동영상 재생목록

최신순 인기순 날짜순

임상연구들 위한 Essential R 온라인특강 1

조회수 2.8천회 • 2년 전

임상연구들 위한 Essential R 온라인특강 2

조회수 1.1천회 • 2년 전

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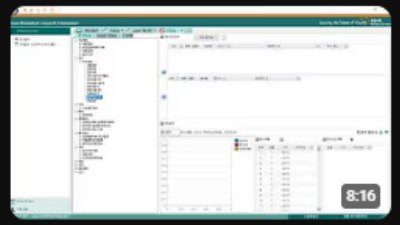
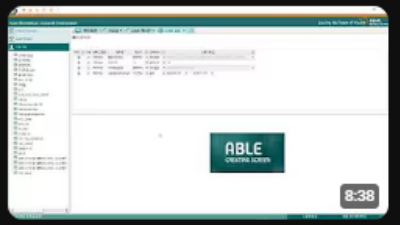


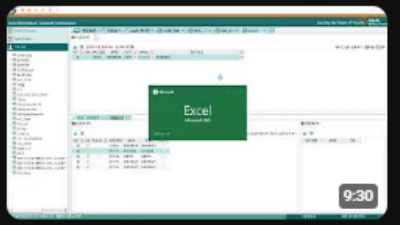
ABLE동영상1 cohort discovery

조회수 334회 • 2년 전



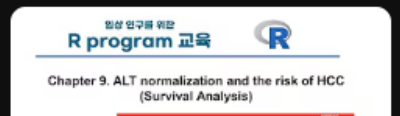
ABLE동영상2 step연결

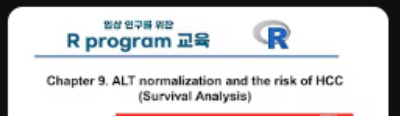
조회수 126회 • 2년 전

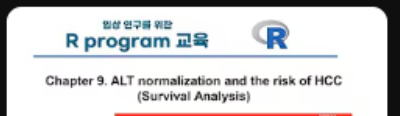


ABLE동영상3 step연결

조회수 93회 • 2년 전







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Recraft

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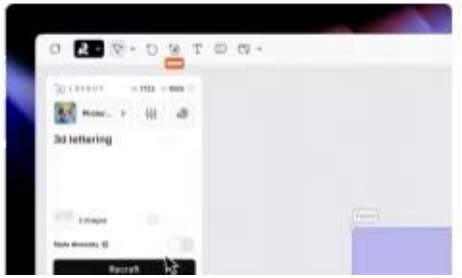

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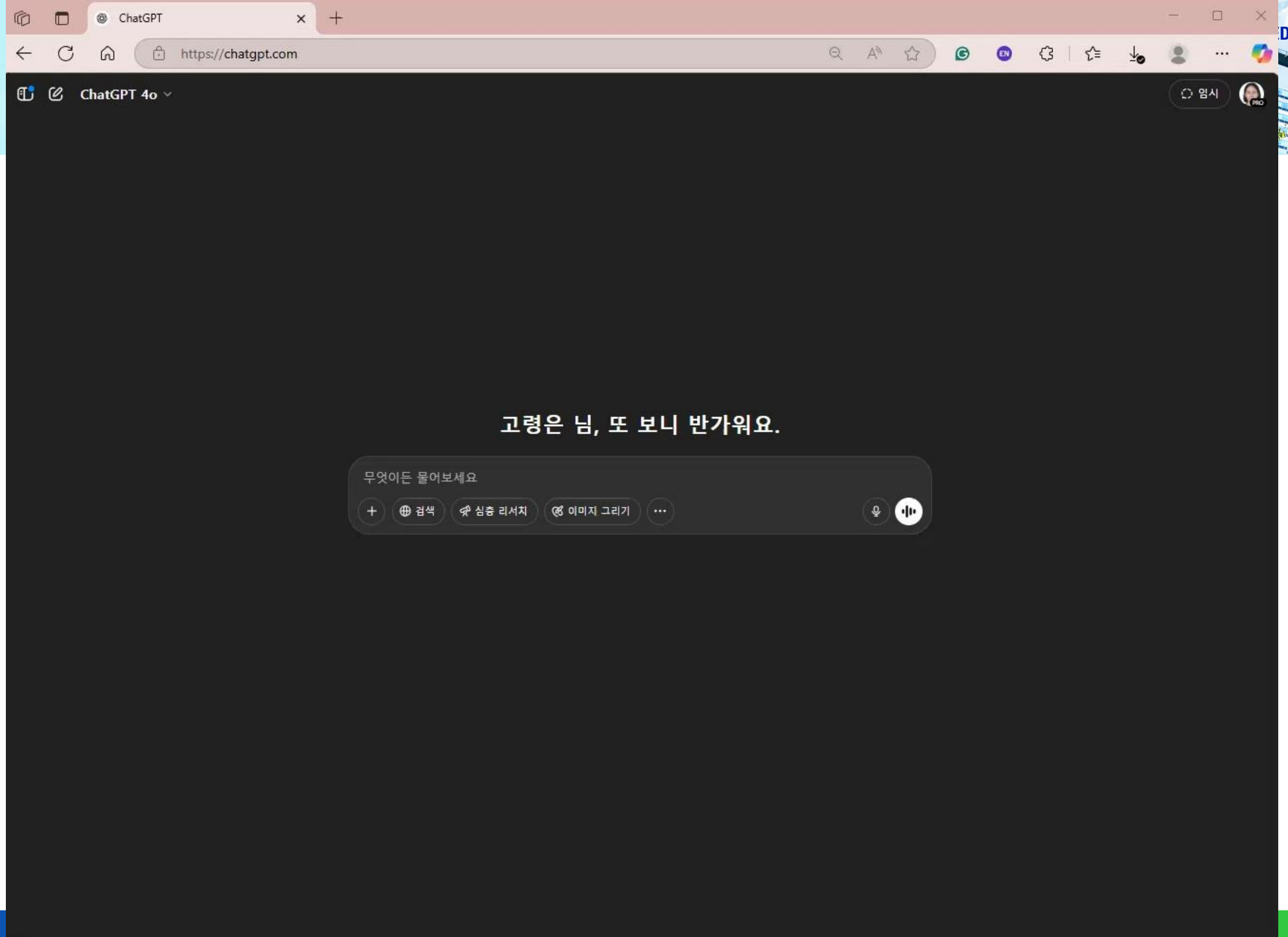
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https://www.miricanvas.com

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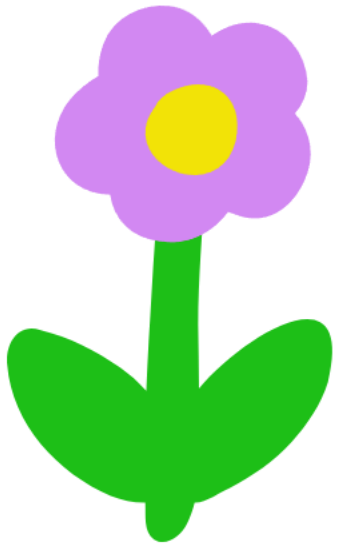

1. 구독 총액제 필수

2. 새로운 tool을 다양하게 사용해보기

3. 나를 도와주는 것이지 나를 대체하는 것이 아님

Thank you!

SAMSUNG MEDICAL CENTER