ATSJournals

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期刊荟萃与浏览

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一、期刊荟萃

1、Ultrasonographic Monitoring of the Diaphragm during Mechanical Ventilation: The Vital Pump Is Vivid, Plastic, and Vulnerable

a) background

The vast majority of critically ill patients are mechanically ventilated, and a significant amount of time is spent weaning patients from mechanical ventilation. It is during weaning that the diaphragm is so important, being a major pathophysiologic determinant of weaning failure or success.

b) viewpoint

The incidence and the prevalence of VIDD are unknown. VIDD has been described in the laboratory in previously healthy animals subjected to CMV and in brain dead patients receiving CMV who were free of infection and other derangements so as to be eligible for organ donation .

c. method

Over recent years there has been enthusiasm for the use of ultrasound in critical care medicine. Along these lines, recent studies have provided us with promising results of the use of ultrasound for monitoring diaphragm function in the ICU.

d. discussion

① VIDD(ventilator-induced diaphragm dysfunction) might be playing a central role in this process, because decreased diaphragmatic thickness was associated with high pressures delivered by the ventilator and with the use of controlled ventilator modes, which predispose to VIDD.

②ICU physicians care how to protect the lung. Yet, they often forget that one of the two vital pumps, the ventilatory pump, exhibits plasticity and vulnerability. We need to learn how to protect the diaphragm with large-scale studies similar to those studies that taught us how to protect the lung.

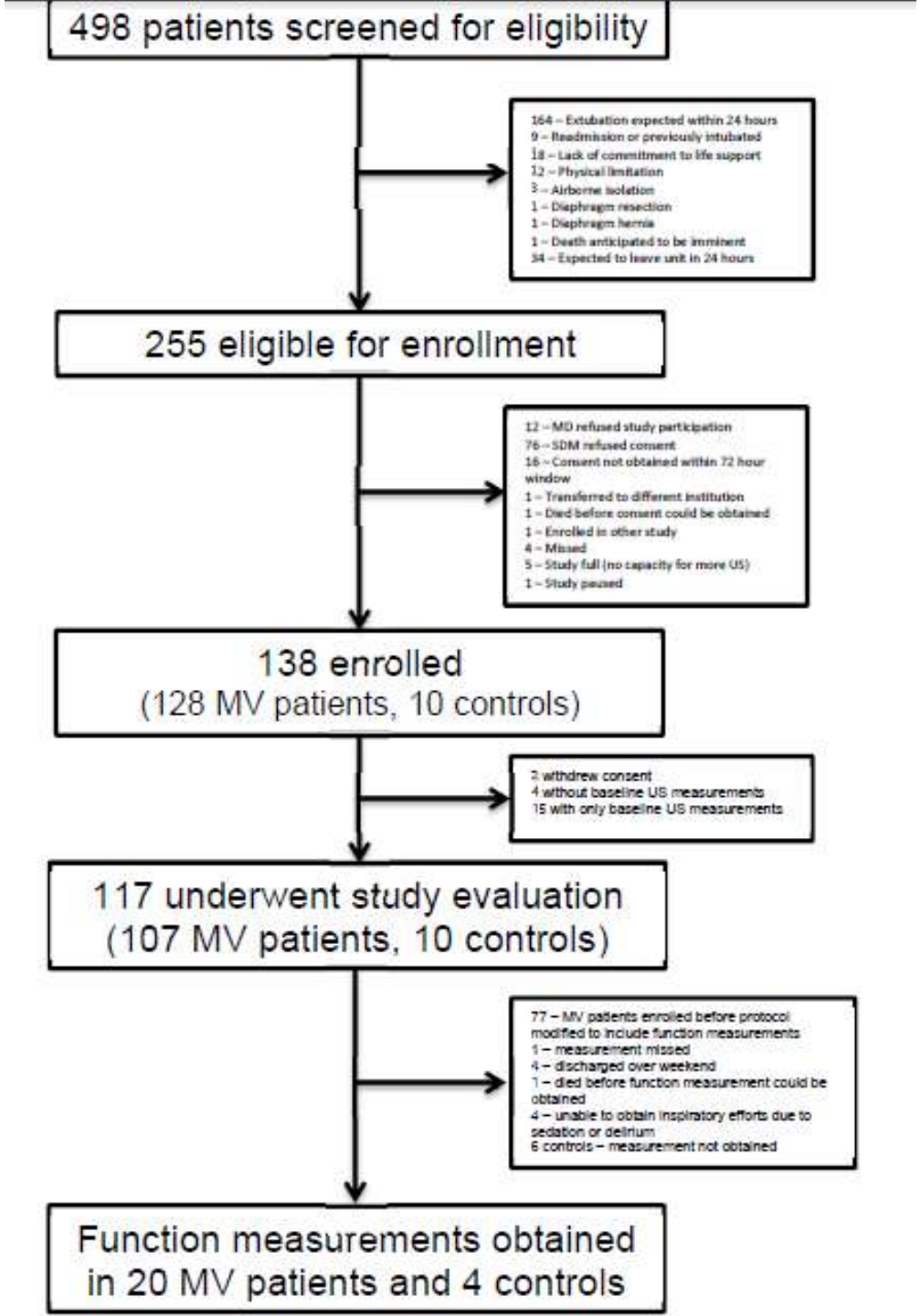
2、Evolution of Diaphragm Thickness During Mechanical Ventilation: Impact of Inspiratory Effort

a) 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.

b) 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.



c) method

In 3 academic intensive care units, 107 patients were enrolled shortly after initiating ventilation along with 10 non-ventilated ICU patients (controls). Diaphragm thickness and contractile activity (quantified by the inspiratory thickening fraction) were measured daily by ultrasound.

d) 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 non-ventilated patients.

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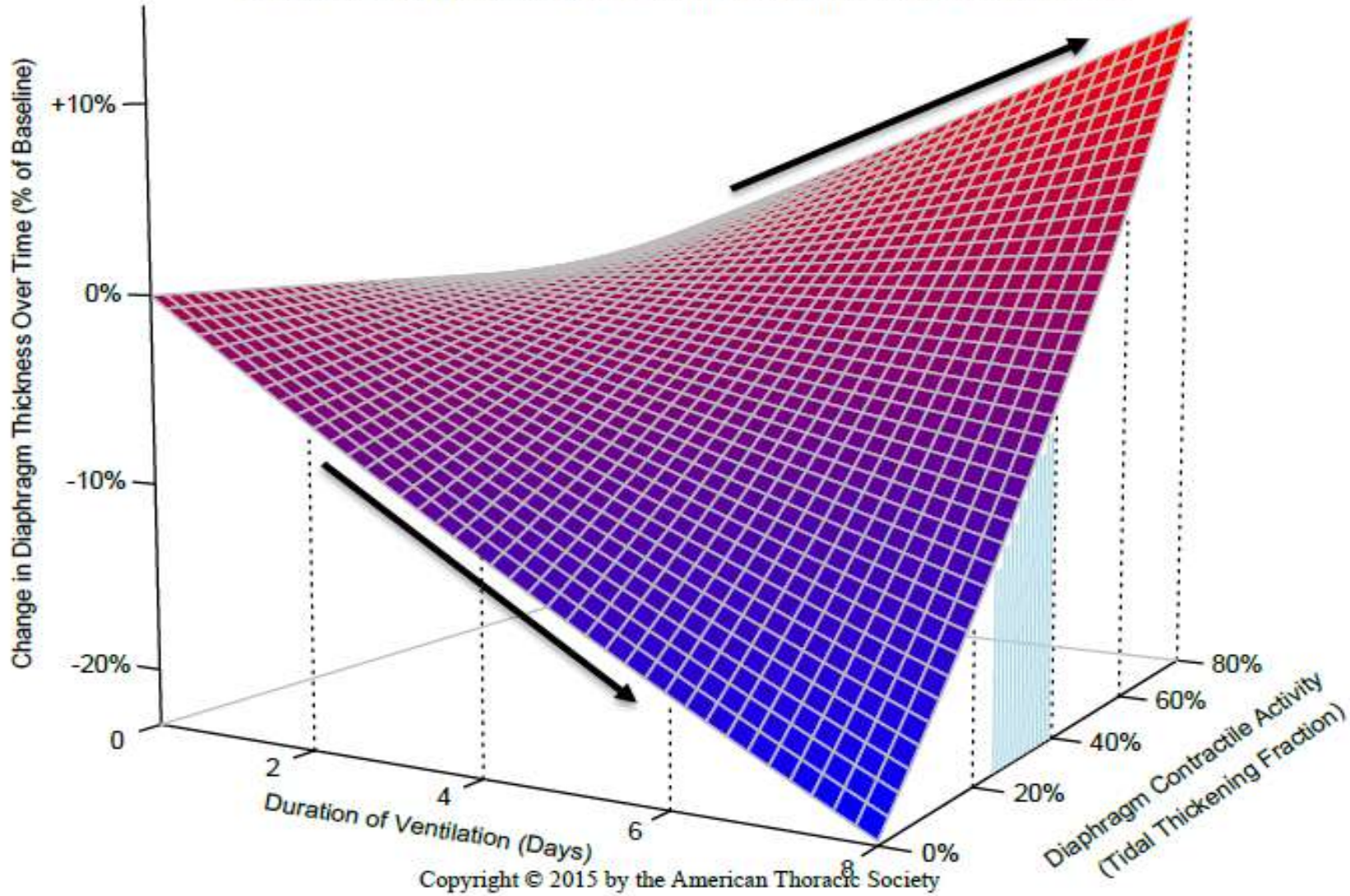


e) Conclusions

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.

3、Early High-Volume Hemofiltration versus Standard Care for Post–Cardiac Surgery Shock

a) Rationale:

Post–cardiac surgery shock is associated with high morbidity and mortality. By removing toxins and proinflammatory mediators and correcting metabolic acidosis, high-volume hemofiltration (HVHF) might halt the vicious circle leading to death by improving myocardial performance and reducing vasopressor dependence.

b) Objectives:

To determine whether early HVHF decreases all-cause mortality 30 days after randomization.

c) Methods:

This prospective, multicenter randomized controlled trial included patients with severe shock requiring high-dose catecholamines 3–24 hours post–cardiac surgery who were randomized to early HVHF (80 ml/kg/h for 48 h), followed by standard-volume continuous venovenous hemodiafiltration (CVVHDF) until resolution of shock and recovery of renal function, or conservative standard care, with delayed CVVHDF only for persistent, severe acute kidney injury.

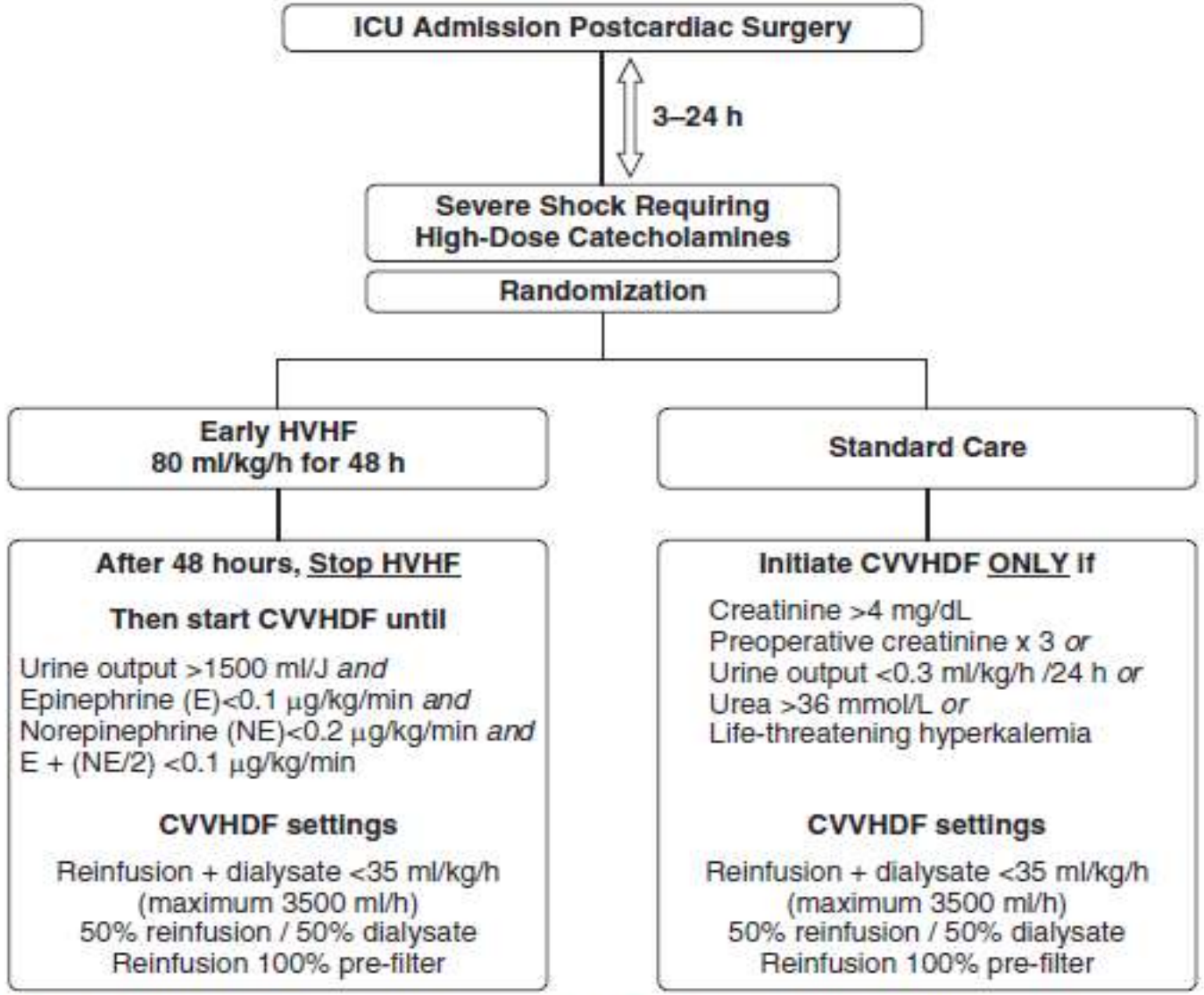


Figure 1. Management of renal-replacement therapy in the two treatment arms. CVVHDF = standard-volume continuous venovenous hemodiafiltration; HVHF = high-volume hemofiltration; ICU = intensive care unit.

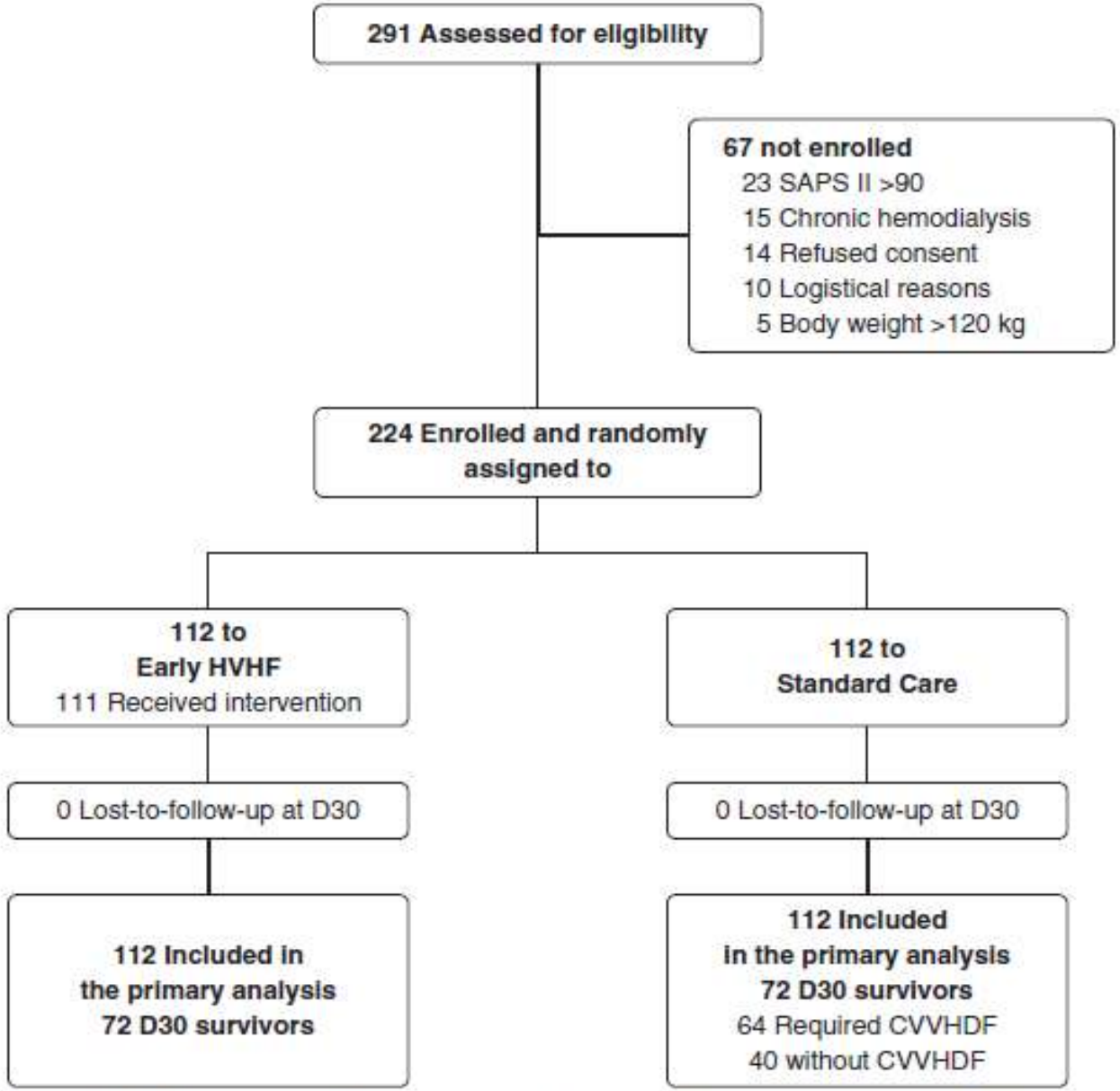


Figure 2. Trial flow chart. CVVHDF = standard-volume continuous venovenous hemodiafiltration; HVHF = high-volume hemofiltration; SAPS II = Simplified Acute Physiology Score II.

d) Measurements and Main Results:

On Day 30, 40 of 112 (36%) HVHF and 40 of 112 (36%) control subjects (odds ratio, 1.00; 95% confidence interval, 0.64–1.56; P = 1.00) had died; only 57% of the control subjects had received renal-replacement therapy.

Variable	Early HVHF (*n* = *112*)	Standard Care (*n* = *112*)	Odds Ratio (95% CI)	*P* Value
Mortality				
Day 30	40 (36%)	40 (36%)	1.00 (0.58–1.73)	1.00
Day 60	48 (43%)	42 (38%)	1.25 (0.73–2.05)	0.82
Day 90	51 (46%)	43 (38%)	1.34 (0.79–2.28)	0.28
ICU	49 (44%)	44 (39%)	1.20 (0.71–2.05)	0.50
In-hospital	50 (45%)	44 (39%)	1.25 (0.73–2.12)	0.42

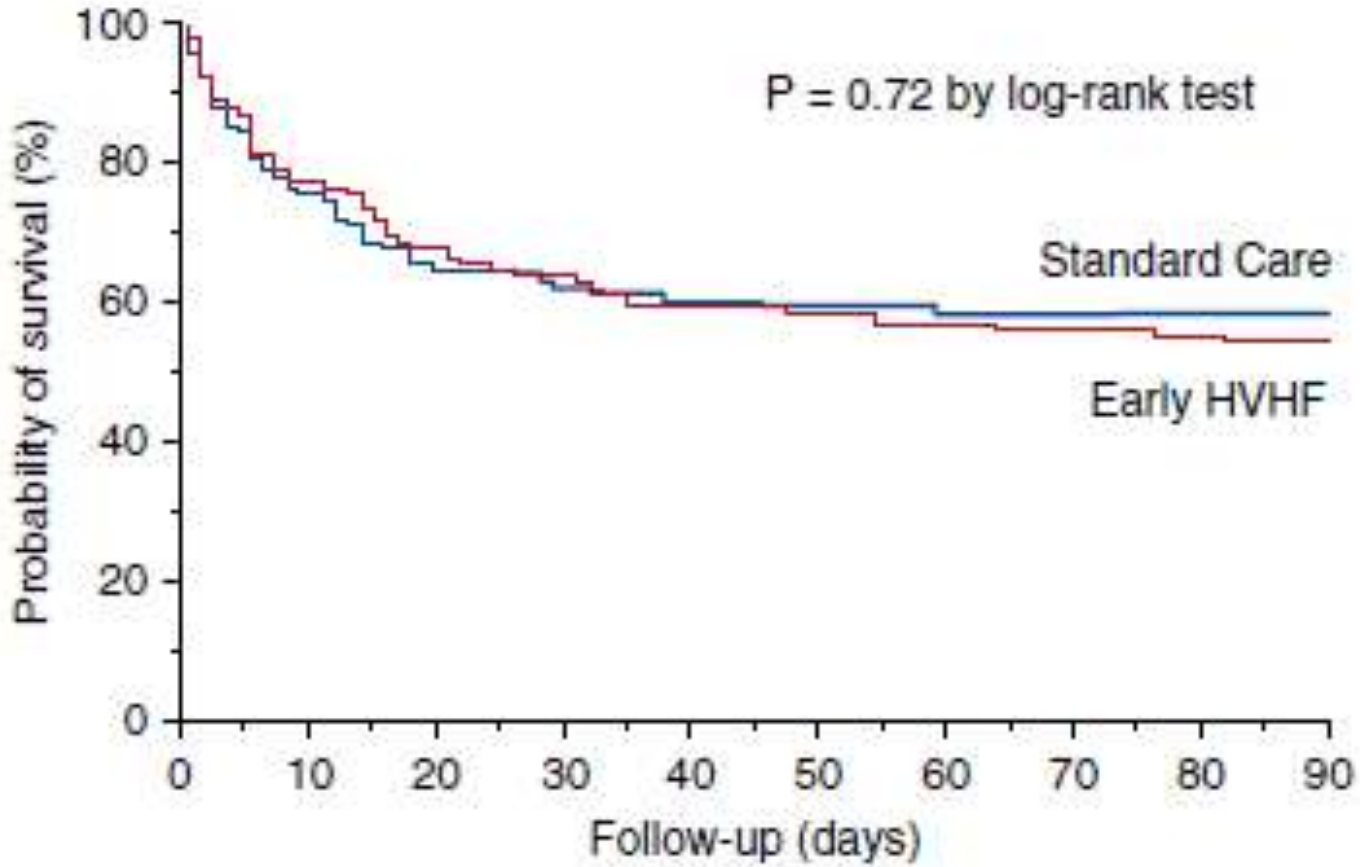


Figure 4. Kaplan-Meier estimates of survival probability until Day 90. For the high-volume hemofiltration (HVHF) and standard-care groups, respectively, Day-30 mortality (36%) and Day-90 mortality (46% and 38%) were comparable.

e) Conclusions:

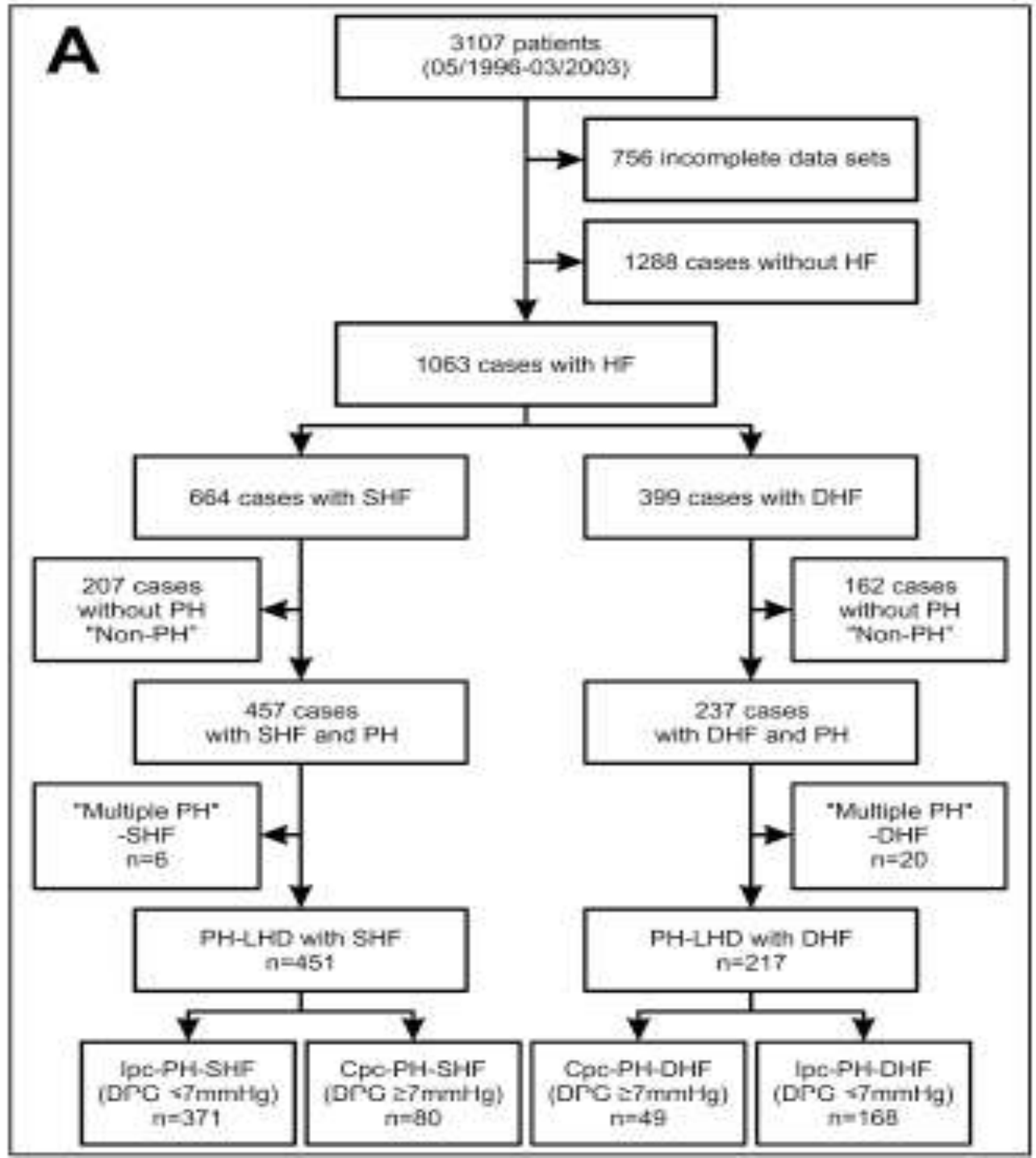
For patients with post–cardiac surgery shock requiring high-dose catecholamines, the early HVHF onset for 48 hours, followed by standard volume until resolution of shock and recovery of renal function, did not lower Day-30 mortality and did not impact other important patient-centered outcomes compared with a conservative strategy with delayed CVVHDF initiation only for patients with persistent, severe acute kidney injury.

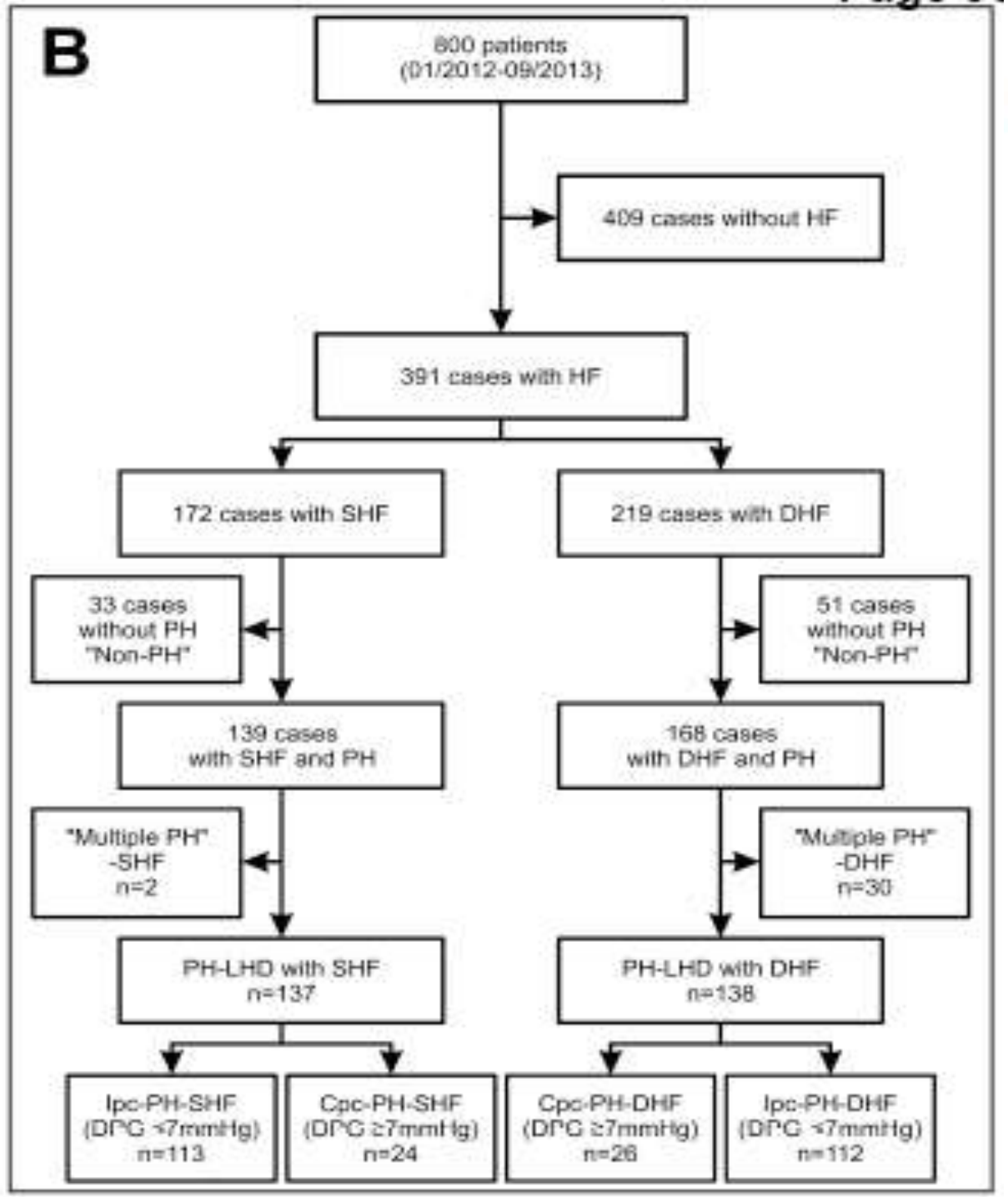
4、Pulmonary hypertension in heart failure: epidemiology, right ventricular function and survival

a) **BACKGROUND:** Patients with pulmonary hypertension due to left heart disease (PHLHD) and a diastolic pulmonary vascular pressure gradient ≥7mmHg representing PH out-of-proportion to pulmonary arterial wedge pressure, have pulmonary vascular disease and increased mortality. Little information exists on this condition, recently labeled as “combined pre- and post-capillary PH” (Cpc-PH). We investigated epidemiology, risk factors, right ventricular function and outcomes in patients with chronic heart failure and Cpc-PH.

b) **METHODS:** The study population was identified from retrospective chart review of a clinical database of 3107 stable patients undergoing first diagnostic right heart catheterization, and from a prospective cohort of 800 consecutive patients at a national university-affiliated tertiary centre.

c) **RESULTS:** In the retrospective cohort were 664 patients with systolic heart failure (SHF), and 399 patients with diastolic heart failure (DHF), 12% of which were classified as Cpc-PH, respectively. In the prospective cohort were 172 patients with SHF (14% Cpc-PH) and 219 patients with DHF (12% Cpc-PH).





d) CONCLUSIONS:

Cpc-PH is rare in chronic heart failure.

5、Recent Trends in the Identification of Incidental Pulmonary Nodules

a) **Rationale:** Pulmonary nodules are common incidental findings, but information about their incidence in the era of computed tomography (CT) is lacking.
b) **Objectives:** Examine recent trends in pulmonary nodule identification.

c) **Methods:** We used electronic health records and natural language processing to identify members of an integrated health system with nodules measuring 4-30 mm. We calculated rates of chest CT imaging, nodule identification, and receipt of a new lung cancer diagnosis within 2 years of nodule identification, and standardized rates by age and sex to estimate the frequency of nodule identification in the U.S. population in 2010.

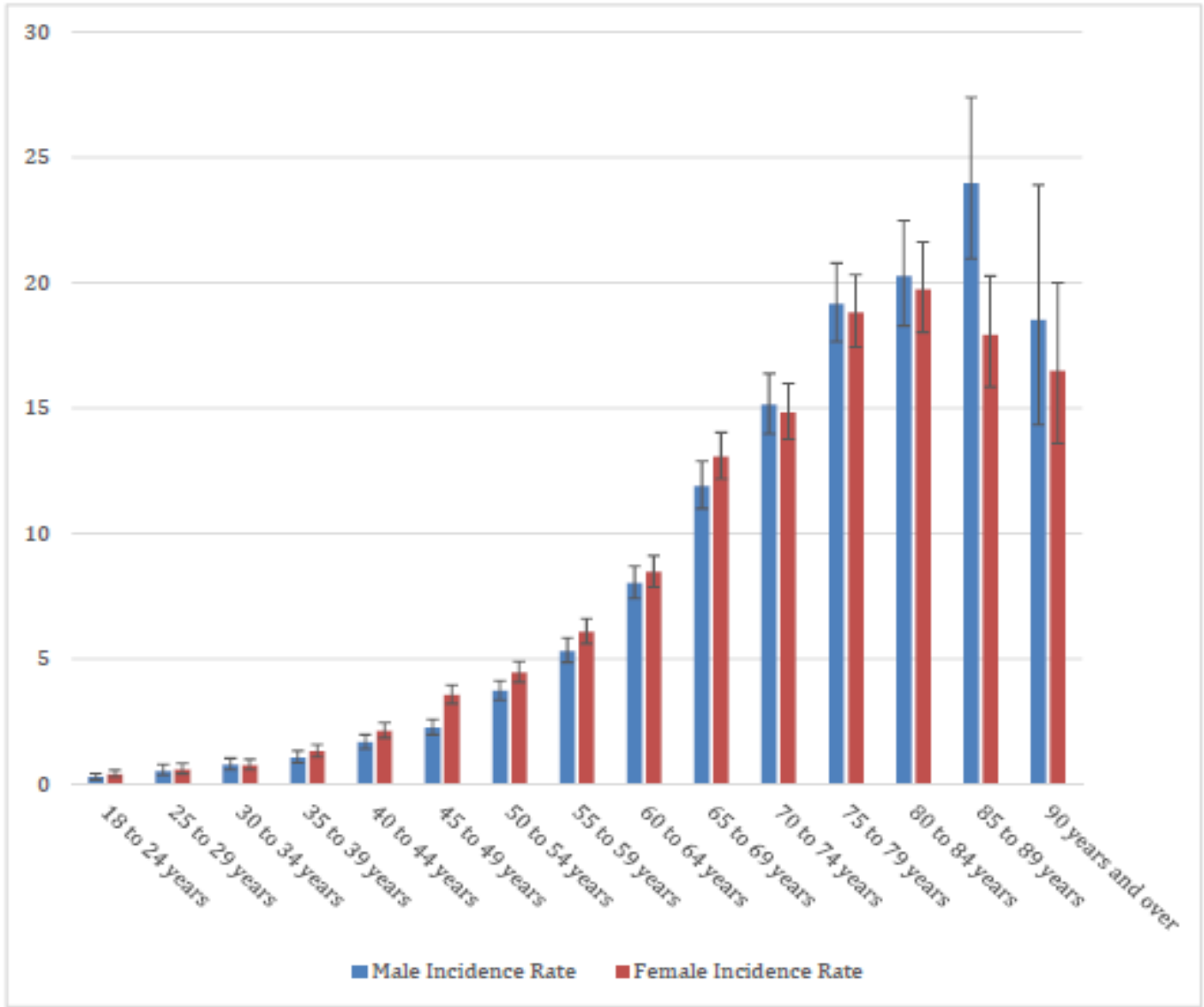
d) Results:

① Between 2006 and 2012, over 200,000 adult members underwent 415,581 chest CT examinations.

② The annual frequency of chest CT imaging increased from 1.3% to 1.9% of all adult members, while the frequency of nodule identification increased from 24% to 31% of all scans performed.

③ The annual rate of chest CT increased from 15.4 to 20.7 per 1,000 person-years, and the rate of nodule identification increased from 3.9 to 6.6 per 1,000 person-years, while the rate of a new lung cancer diagnosis remained stable.

Year	≥1 Chest CT Scan Performed †	≥1 Positive CT Scan †
	Rate per 1,000 Person-Years (95% CI)	Rate per 1,000 Person-Years (95% CI)
2006	15.4 (15.2, 15.5)	3.9 (3.8, 4.0)
2007	16.1 (15.9, 16.2)	4.6 (4.6, 4.7)
2008	17.5 (17.3, 17.7)	5.1 (5.0, 5.2)
2009	19.3 (19.1, 19.5)	5.8 (5.7, 5.9)
2010	20.0 (19.8, 20.2)	6.5 (6.4, 6.6)
2011	20.5 (20.3, 20.7)	6.4 (6.3, 6.5)
2012	20.7 (20.5, 20.9)	6.6 (6.5, 6.7)
2006-2012	18.6 (18.5, 18.6)	5.6 (5.6, 5.7)



e) **Conclusions:** Incidental pulmonary nodules are an increasingly common consequence of routine medical care, with an incidence that is much greater than recognized previously. More frequent nodule identification has not been accompanied by increases in the diagnosis of cancerous nodules.

7、Characteristics and Outcomes of Eligible Nonenrolled Patients in a Mechanical Ventilation Trial of Acute Respiratory Distress Syndrome

a) **Rationale:** Patients eligible for randomized controlled trials may not be enrolled for various reasons. Nonenrollment may affect study generalizability and lengthen the time required for trial completion.

b) **Objectives:** To describe characteristics and outcomes of eligible nonenrolled (ENE) patients in a multicenter trial of mechanical ventilation strategies.

c) methods

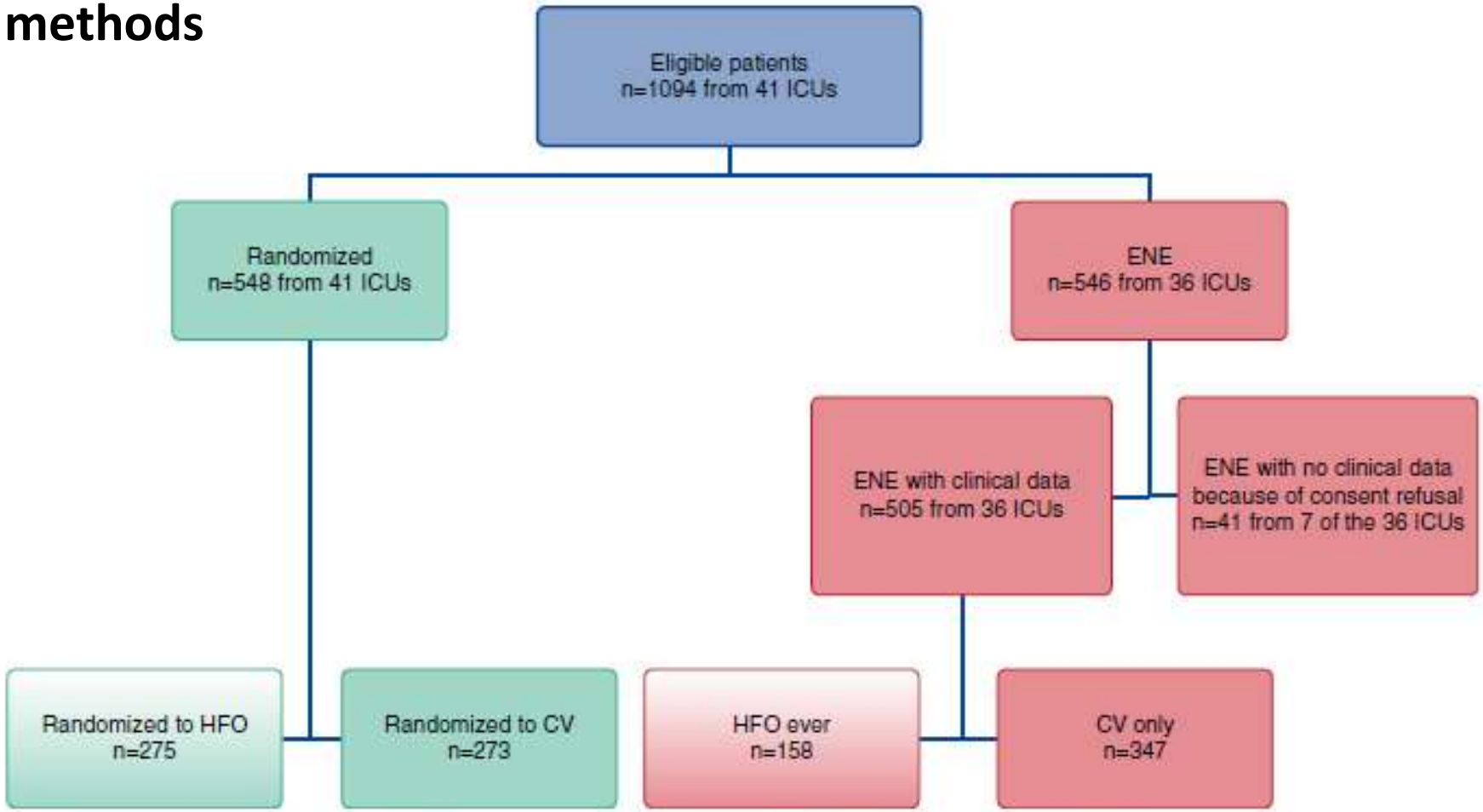


Figure 1. Patient flow. Research ethics boards (REBs) for five intensive care units (ICUs) prohibited any data on eligible-not-enrolled (ENE) patients from being collected. In 7 of the remaining 36 ICUs, the REB stipulated that if the reason for nonenrollment was refusal of consent to participate in the trial, only the reason for nonenrollment could be recorded, and not the additional clinical data. CV = conventional ventilation; HFO = high-frequency oscillation.

d) Main Results:

① A total of 548 patients were randomized, and 546 were ENE. The most common reasons for ENE were no consent (42%), physician refusal (24%), missed randomization window (15%), and current HFO use (14%).

② Compared with randomized patients in respective arms of the trial, ENE-HFO patients were younger and had worse lung injury, whereas ENE-CV patients had lower illness severity.

③ENE status was independently associated with mortality (adjusted odds ratio, 1.39; 95% confidence interval, 1.06–1.84; P = 0.02), with no significant interaction with ventilation treatment group.

Table 1. Reasons for Nonenrollment among Eligible Patients

Reason for Nonenrollment	All ENE Patients (*n* = 546)	HFO-ENE (*n* = 158)	CV-ENE (*n* = 388)	*P* Value
No patient/SDM consent obtained, n (%)	229 (42.0)	26 (16.5)	203 (52.3)	<0.0001
No SDM	47 (20.5)	8 (30.8)	39 (19.2)	0.49
Unable to locate SDM	35 (15.3)	5 (19.2)	30 (14.8)	
SDM unable to decide in time	23 (10.0)	2 (7.7)	21 (10.3)	
SDM declined	109 (47.6)	9 (34.6)	100 (49.3)	
Other	15 (6.6)	2 (7.7)	13 (6.4)	
Physician refusal, n (%)	129 (23.7)	46 (29.1)	83 (21.4)	0.05
Definite plan to use HFO	38 (29.5)	33 (71.7)	5 (6.0)	<0.0001
Refuse HFO	17 (13.2)	4 (8.7)	13 (15.7)	
Concern about paralysis	7 (5.4)	0 (0)	7 (8.4)	
Concern about HFO protocol	13 (10.1)	3 (6.5)	10 (12.1)	
Concern about CV protocol	5 (3.9)	0 (0)	5 (6.0)	
Reluctant to follow protocols in general	24 (18.5)	2 (4.4)	22 (26.5)	
Other concern with study	4 (3.1)	0 (0)	4 (4.8)	
Other	21 (16.3)	4 (8.7)	17 (20.5)	
Eligible >72 h, n (%)	81 (14.8)	10 (6.3)	71 (18.3)	0.0004
Current HFO use, n (%)	76 (13.9)	76 (48.1)	—	—
Participation in another trial, n (%)	22 (4.0)	0 (0)	22 (5.7)	0.0006
Oscillator unavailable, n (%)	9 (1.6)	0 (0)	9 (2.3)	0.07

Definition of abbreviations: CV = conventional ventilation; ENE = eligible-not-enrolled; HFO = high-frequency oscillation; SDM = substitute decision maker.
Reasons for nonenrollment are mutually exclusive. *P* value reflects comparison between HFO-ENE and CV-ENE.

e) **Conclusions:** Our study suggests that enrollment in trials of mechanical ventilation may be associated with improved outcomes compared with standard care and highlights the need for prospective tracking and transparent reporting of ENE patients as part of trial management.

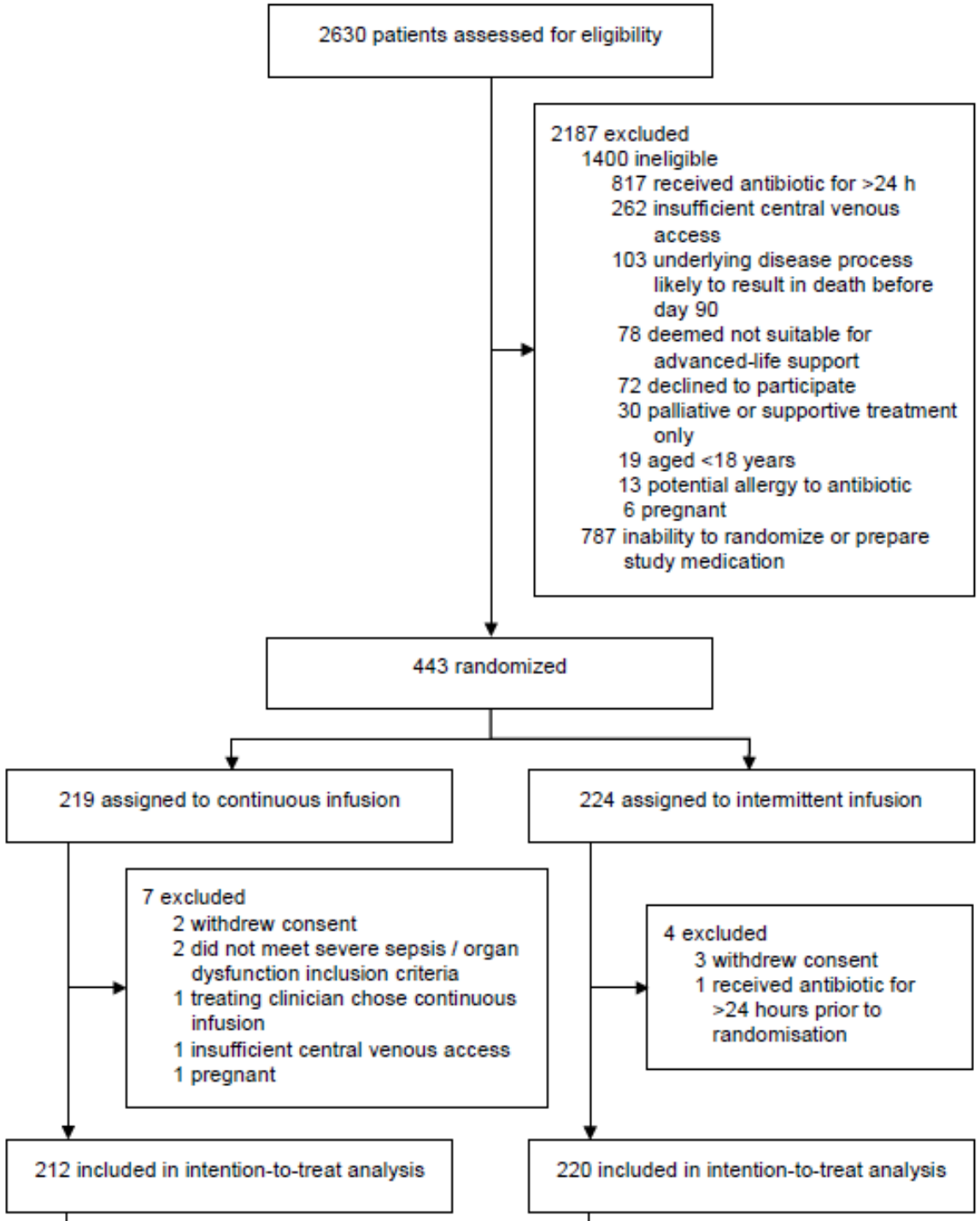
7、A Multicenter Randomized Trial of Continuous versus Intermittent β-Lactam Infusion in Severe Sepsis

a) **Rationale:** Continuous infusion of β-lactam antibiotics may improve outcomes due to time-dependent antibacterial activity compared to intermittent dosing.
b) **Objectives:** To evaluate the efficacy of continuous versus intermittent infusion in patients with severe sepsis.

c) **Methods:**

① We conducted a randomized controlled trial in 25 intensive care units (ICUs). Participants commenced on piperacillin-tazobactam, ticarcillin-clavulanate or meropenem were randomized to receive the prescribed antibiotic via continuous or 30-minute intermittent infusion for the remainder of the treatment course or until ICU discharge.

② The primary outcome was the number of alive ICU-free days at day 28. Secondary outcomes were 90-day survival, clinical cure 14 days post antibiotic cessation, alive organ failure-free days at day 14 and duration of bacteremia.



d) result

① At 28 days, there was no difference in the primary outcome measure of alive ICU-free days: 18 days (IQR 2–24) in the continuous group and 20 days (IQR 3–24) in the intermittent group (P = 0.38). At 90 days, there was no difference in survival between participants in the continuous and intermittent groups;

② There was no difference in clinical cure assessed 14 days after antibiotic cessation in the continuous group compared with the intermittent group;

③ Alive organ-failure free days at day 14 did not differ between treatment groups ;

④ In participants with an identified pathogenic organism, there was no difference in the duration of bacteremia between groups.

Table 3. Primary and secondary outcomes, clinical results and adverse events

	Continuous (n = 212)	Intermittent (n = 220)	*P* Value
Alive ICU-free days	18 (2–24)	20 (3–24)	0.38
ICU survivors	21 (12–24)	22 (14–25)	0.12
Day-90 survival*†	156 (74.3)	158 (72.5)	0.67
ICU survival†	180 (84.9)	182 (82.7)	0.54
Hospital survival†‡	168 (79.2)	164 (74.9)	0.28
Clinical cure	111 (52.4)	109 (49.5)	0.56
Organ failure-free days	6 (0–10)	6 (0–11)	0.27
Duration of bacteremia (days)§	0 (0–0)	0 (0–1)	0.24
ICU length of stay (days)‖	7 (3–13)	6 (3–11)	0.042
Hospital length of stay (days)‖	16 (8–32)	14 (8–27)	0.25
Adverse events	20 (9.4)	28 (12.7)	0.28
Serious adverse events	19 (9.0)	25 (11.4)	0.41

Table 2. Microbiological characteristics

	Continuous (n = 40)	Intermittent (n = 43)
Gram positive	11 (27.5)	11 (25.6)
Gram negative	29 (72.5)	31 (72.1)
Susceptible to study drug*	39 (97.5)	37 (86.0)
Non-susceptible to study drug†	1 (2.5)	6 (14.0)

e) **Conclusions:** In critically ill patients with severe sepsis, there was no difference in outcomes between β-lactam antibiotic administration by continuous and intermittent infusion.

8、Endotoxin Exposure: Predictors and Prevalence of Associated Asthma Outcomes in the United States

a) **Rationale:** Inhaled endotoxin induces airway inflammation and is an established risk factor for asthma. The 2005–2006 National Health and Nutrition Examination Survey included measures of endotoxin and allergens in homes as well as specific IgE to inhalant allergens.

b) **Objectives:** To understand the relationships between endotoxin exposure, asthma outcomes, and sensitization status for 15 aeroallergens in a nationally representative sample.

c) Methods:

① Participants were administered questionnaires in their homes. Reservoir dust was vacuum sampled to generate composite bedding and bedroom floor samples.

② We analyzed 7,450 National Health and Nutrition Examination Survey dust and quality assurance samples for their endotoxin content using extreme quality assurance measures. Data for 6,963 subjects were available, making this the largest study of endotoxin exposure to date.

d) **Results:** Endotoxin exposure was significantly associated with wheeze in the past 12 months, Models adjusted for age, sex, race and/or ethnicity, and poverty-to-income ratio and stratified by allergy status showed that these relationships were not dependent upon sensitization status but were worsened among those living in poverty.

e) **Conclusions:** In this U.S. nationwide representative sample, higher endotoxin exposure was significantly associated with measures of wheeze, with no observed protective effect regardless of sensitization status.

二、题目浏览

1. Exposure to Endotoxin in Household Dust. To Wheeze or Not to Wheeze；
2. Multicenter Comparison of Lung and Oral Microbiomes of HIV-infected and HIV-uninfected Individuals；
3. Biomarker Development for Chronic Obstructive Pulmonary Disease. From Discovery to Clinical Implementation；

4. Clinical and Immunological Factors in Emphysema Progression. Five-Year Prospective Longitudinal Exacerbation Study of Chronic Obstructive Pulmonary Disease (LES-COPD);
5. Pulmonary Phototherapy for Treating Carbon Monoxide Poisoning；

6. Effects of Aged Stored Autologous Red Blood Cells on Human Endothelial Function；
7. Future Research Directions in Asthma. An NHLBI Working Group Report；
8. The Role of Short-Chain Fatty Acids, Produced by Anaerobic Bacteria, in the Cystic Fibrosis Airway.

Thank you