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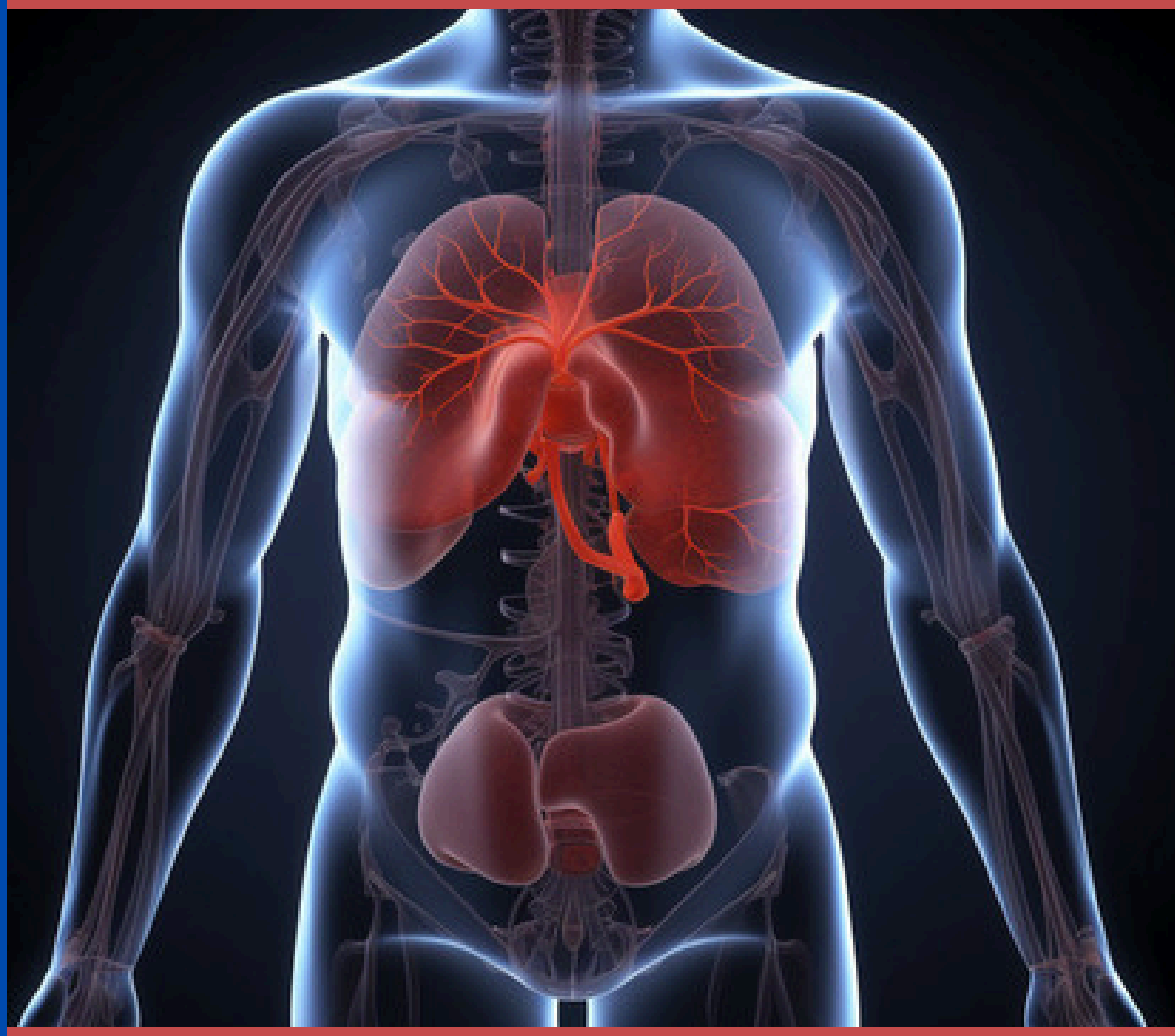

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COMPILED AND REVIEWED BY
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VIEWPOINTS
STEROIDS IN THE ICU – SEPTIC SHOCK, ARDS AND SEVERE CAP

VIEWPOINTS COMPILED BY BHARAT BAJANTRI, MD.
ADOPTED FROM PULMCC AND CITED ARTICLES.

The Society of Critical Care Medicine (SCCM) has updated its guidelines to recommend moderate-dose intravenous corticosteroids for all patients with septic shock, departing from its previous recommendation limited to severe cases requiring high-dose or multiple vasopressors. Recent trials have shown conflicting results regarding mortality benefits, but consistent findings indicate faster resolution of shock with steroid use. Hydrocortisone in specified doses and duration is commonly used, while the evidence for co-administration of mineralocorticoids remains inconclusive. Although the mortality benefit of steroids in septic shock is uncertain, they appear to reduce the duration of vasopressor use and improve ICU outcomes. However, the risk of long-term side effects such as neuromuscular weakness is acknowledged, leading to caution against high-dose steroid use. SCCM's updated guidance also includes strong recommendations for steroid use in severe community-acquired pneumonia, diverging from previous weaker suggestions.
The concept of critical illness-related corticosteroid insufficiency (CIRCI), introduced jointly by SCCM and the European Society of Intensive Care Medicine (ESICM) in 2008, has not gained widespread acceptance due to its vague definition and lack of reliable diagnostic criteria. Still, steroid use in critically ill patients is based largely on clinical judgment rather than standardized tests. While the exact mechanisms of corticosteroid effects in critical illness are not fully understood, recent studies have shown their benefit in conditions such as Covid pneumonia with ARDS and severe community-acquired pneumonia.
The updated SCCM guidance recommends administering steroids for severe community-acquired pneumonia based on convincing evidence, without formally defining the severity of pneumonia. Similarly, steroids are suggested for all patients with ARDS, building upon previous recommendations for moderate to severe cases. The choice of steroid and dosing regimen is left to the clinician's discretion, with various options mentioned based on clinical trials.

In 2023, ATS and ESICM released conflicting guidelines on ARDS, with SCCM opting not to align with either society's update. This situation underscores the ongoing debate and uncertainty surrounding the optimal use of steroids in critical care settings. The fractured consensus among professional societies on steroid use in critical illness adds complexity to decision-making for clinicians, with individual judgment playing a key role. Regardless, the threshold to start someone on steroids for septic shock, ARDS or severe community acquired pneumonia will likely be all time low.

ORIGINAL STUDY SUMMARIES:

BRONCHOSCOPIC LUNG VOLUME REDUCTION (BLVR) - *ARE WE LOOKING AT THE WRONG OUTCOMES?*

BY BHARAT BAJANTRI, MD.

The emergence of bronchoscopic lung volume reduction (BLVR) marks a pivotal advancement in emphysema treatment by offering a less invasive alternative to surgery. By inducing atelectasis in damaged lung lobes, BLVR, particularly utilizing the Spiration Valve System (SVS), enhances diaphragmatic function. While initial approval by the U.S. Food and Drug Administration was based on short-term data, the durability of SVS efficacy over 24 months remained unclear.

To address this gap, a study compared 24-month outcomes of lung function, respiratory symptoms, and quality of life (QOL) between treated and control groups from the EMPROVE trial. The 24-month cohort group contained 80 patients in the treatment group and 34 patients in the control group. The aim was to evaluate SVS longevity in severe emphysema, crucial for patient and physician decision-making.

Initially, EMPROVE focused on short-term spirometric improvements at 6 and 12 months, alongside secondary endpoints like health status and dyspnea. Although significant improvements were noted, serious adverse events, including pneumothorax, raised concerns. Furthermore, the treatment group also showed statistically significant improvements in all secondary endpoints at 6 and 12 months, except for 6-minute-walk distance. Moreover, complete lobar atelectasis, a key goal, was achieved in less than 50% of patients. The disconnect between the lack of complete lobar atelectasis and endpoint achievement highlighted the multifactorial and individualized nature of success with BLVR. The follow-up study revealed sustained FEV1 improvements at 24 months, albeit with a decrease in FEV1 responders, mirroring control group rates. However, QOL measures, including St. George’s Respiratory Questionnaire and COPD assessment test, showed enduring benefits in the SVS group. Notably, dyspnea reduction remained significant, highlighting the treatment's symptomatic impact. On the contrary, the assessment of the 36-item Short Form Health Survey and Quality of Well-Being scores at the 24-month mark did not reveal statistically significant enhancements. Moreover, there were comparable occurrences of serious adverse events and mortality rates between both groups. Specifically, at the 24-month juncture, mortality rates stood at 18% for the treatment group and 15% for the control group, with a non-significant difference. These findings indicate no substantial disparities between the SVS treatment group and the control group in these aspects.

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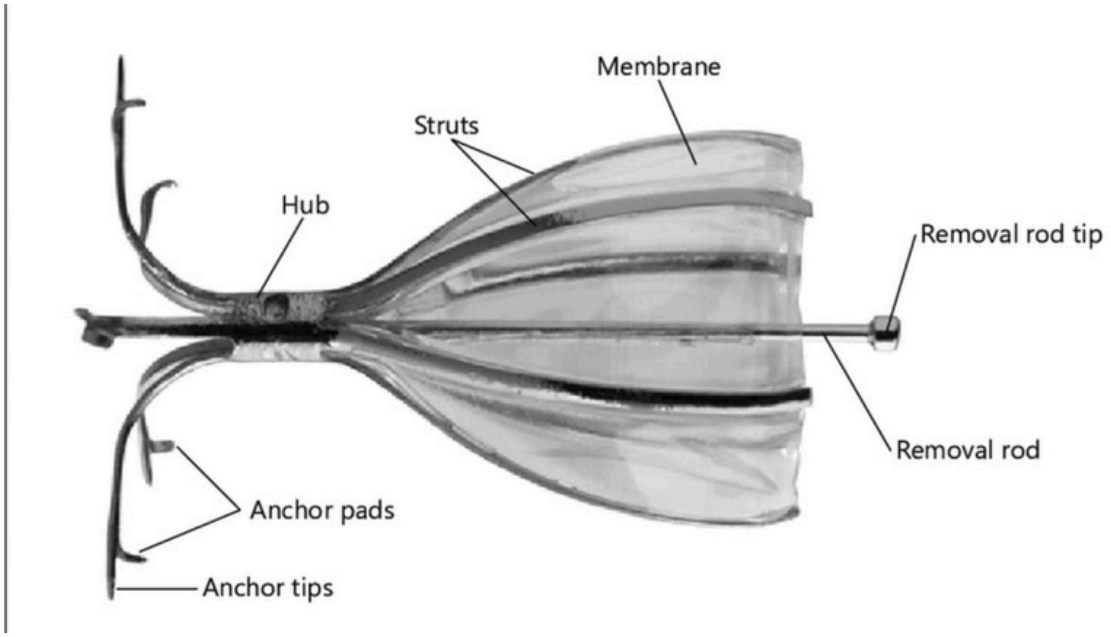

While the two-year EMPROVE data demonstrate ongoing statistically significant differences in FEV1 improvement between the SVS and control groups, the proportion of FEV1 responders sharply declined from 37.2% at 12 months to 19.7%. This decline mirrors the 13.3% responder rate observed in the control group at 24 months. Such a substantial decrease in FEV1 responders, nearing that of the control group, could stem from disease progression or the loss of previously achieved atelectasis. However, should this decline in spirometric measures be considered a failure in realizing long-term benefits? No.

Regardless of spirometric fluctuations, the sustained improvements in symptoms and QOL should take precedence in the 24-month analysis by Criner and colleagues. The maintenance of these QOL outcomes and symptom ameliorations enables patients to lead active, fulfilling lives and mitigates the downward trajectory of emphysema-associated deconditioning and emotional distress. Ultimately, these are the outcomes that physicians should prioritize when assessing the sustained success of BLVR. Despite concerns about unblinding bias, the study suggests minimal impact on subjective outcomes, reinforcing the validity of observed improvements.

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BRONCHOSCOPIC LUNG VOLUME REDUCTION (BLVR) - ARE WE LOOKING AT THE WRONG OUTCOMES?

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The findings underscore a broader debate on defining BLVR success. While spirometric metrics serve as objective benchmarks, sustained symptom relief and improved QOL are equally crucial. The study prompts a shift towards prioritizing functional outcomes, emphasizing patients' ability to lead active, fulfilling lives post-treatment.
In conclusion, the study offers valuable insights into the long-term efficacy of SVS in BLVR, emphasizing the enduring benefits beyond spirometry. It urges physicians to reevaluate success criteria, focusing on holistic patient outcomes rather than isolated lung function metrics.

Contributed photos from Dr. Vatche Israbian; vacation in San Juan, Puerto Rico. Featuring the beautiful coastline, and Barrachina, the birth place of the Piña Colada.

ORIGINAL STUDY SUMMARY & PERSPECTIVE

First.... Do NO HARM with PPI!

BY BHARAT BAJANTRI, MD. & CATERINA ELLIOTT PA

In the intensive care unit (ICU), Proton Pump Inhibitors (PPIs) are frequently prescribed to mitigate the risk of stress-induced mucosal damage and bleeding, a condition that, while uncommon, can significantly escalate morbidity and mortality rates. Despite generally favorable safety profiles, extended PPI use has been linked to heightened risks of serious complications, such as pneumonia, Clostridium difficile infection, chronic kidney disease, gastrointestinal cancers, gall bladder dysfunction, hepatic encephalopathy, inhibition of the CYP2C19 enzyme, impaired absorption of medications reliant on acidic pH, osteoporosis and bone fractures, small intestinal bacterial overgrowth, as well as deficiencies in essential vitamins and minerals (such as calcium, iron, magnesium, and Vitamin B12), delirium, and dementia. Moreover, an increasing body of evidence indicates that patients often receive PPIs without a documented indication and for durations far surpassing what is typically warranted.

A retrospective cohort study analyzed 11,576 critically ill patients drawn from a German health insurer database. These patients were initiated with PPI therapy for the first time during their ICU stay and lacked a documented indication for its continuation post-hospital discharge. The study contrasted patients who ceased PPI therapy with those who persisted with treatment beyond 8 weeks following hospital discharge. Propensity score matching was employed to ensure comparability between the two groups, minimizing significant differences.

Results: The findings of the study are both surprising and concerning: 41.7% of the study participants were administered PPI therapy for a duration exceeding 8 weeks post-hospital discharge without a clear medical indication. Among the 4,825 patients analyzed, 45% were subjected to long-term PPI therapy (> 8 weeks to 1 year), while 55% received permanent therapy (> 1 year). Over a two-year follow-up period, these individuals exhibited significantly elevated risks of pneumonia (27%), cardiovascular events (17%), rehospitalization (34%), and mortality (20%).

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Notably, PPI therapy was associated with a 2.7-fold increased risk of esophageal cancer, a 2.4-fold increased risk of pancreatic cancer, and a 19% increased risk of colorectal cancer. Moreover, examination of malabsorption revealed a 1.3-fold increased risk of vitamin B12 deficiency, a 2.1-fold increased risk of hypomagnesemia, and a 1.6-fold increased risk of hypocalcemia.
Continued unexplained PPI therapy was associated with a 6.1% absolute risk difference and 35% increased odds of rehospitalization within the first year. Furthermore, the persistence of PPI therapy correlated with nearly a 20% heightened risk of mortality over a two-year period.

Clinical Implications:
These findings underscore a potential source of preventable harm for our patients. Recent studies have highlighted elevated risks of all-cause and cause-specific mortality among individuals receiving Proton Pump Inhibitors (PPIs) . This study is the first to report such findings specifically in ICU survivors. Plausible pathophysiological mechanisms for the increased mortality risk associated with PPIs have been proposed, including an augmented risk of infection due to decreased gastric acid secretion and alterations in gut bacterial flora. PPI therapy has also been linked to endothelial dysfunction and vasoconstriction, which could explain the increased incidence of cardiovascular events. Moreover, ICU survivors constitute a vulnerable population that remains at heightened risk of morbidity and mortality even after recovering from critical illness, and the adverse effects of PPI therapy may exacerbate their preexisting risk factors.

While randomized controlled trials (RCTs) are typically the gold standard for addressing important questions regarding drug safety, conducting such a trial to investigate PPI-related harm appears impractical. Even without definitive causal confirmation, there are compelling clinical and economic rationales for discontinuing non-indicated PPI therapy.

ORIGINAL STUDY SUMMARY & PERSPECTIVE

First…. Do NO HARM with PPI!

BY BHARAT BAJANTRI, MD. & CATERINA ELLIOTT PA

Stress Ulcer Prophylaxis in the ICU trial, the largest and most recent RCT on PPI therapy, failed to demonstrate a beneficial effect on 90-day mortality or on a composite outcome of clinically significant events in a general ICU population with conventional risk factors for stress ulceration and bleeding. This implies that PPI therapy should be reserved for severely ill patients at high risk for such complications. Moreover, a body of literature suggests that stress ulcer prophylaxis may not confer benefits in critically ill patients receiving enteral nutrition.

It is imperative to prioritize the cessation of non-indicated Proton Pump Inhibitors (PPIs). Given the absence of clear directives in existing guidelines regarding when to discontinue PPI therapy, a pragmatic approach involves assessing the risk factors predisposing individuals to stress ulceration. Once these stressors have been addressed and mitigated, prophylaxis can be safely ceased.
Barriers to medication discontinuation have been identified, including inadequate education among healthcare providers, fragmented care involving multiple prescribers, incomplete documentation regarding the rationale for administration, and uncertainty regarding the benefits and risks associated with discontinuing the medication.

Various system-based strategies have been reported to effectively reduce non-indicated Proton Pump Inhibitor (PPI) therapy. These strategies, often employed in combination, encompass education and awareness campaigns, guideline implementation, medication use reviews and reconciliation, electronic clinical decision support systems, and pharmacist-led discontinuation programs. Notably, empowering pharmacists with prescriptive authority for stress ulcer prophylaxis has proven to enhance the cost-effective utilization of PPIs in critically ill patients, while simultaneously improving time efficiency for both pharmacists and physicians.

ORIGINAL STUDY SUMMARY & PERSPECTIVE

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Furthermore, patient-related factors contributing to the unnecessary continuation of PPI therapy has been recognized. These factors include heightened medical complexity, admission to surgical intensive care units (ICUs) as opposed to medical ICUs, prolonged hospital stays, a larger number of discharge medications, and discharge to rehabilitation or skilled nursing facilities.

Consequently, targeting deprescribing interventions towards these "high-risk" patient groups may yield particularly effective outcomes. Ceasing a clinical practice, such as discontinuing PPI therapy, has been demonstrated to pose greater psychological challenges than adopting a new practice. It is crucial to recognize deprescribing PPI therapy as a straightforward, yet impactful patient-centered intervention aimed at enhancing well-being—consistent with the same principles guiding prudent prescribing practices upon medication initiation. What is increasingly evident is that while PPIs offer clear clinical benefits, persisting with their use without a reasonable likelihood of benefit is both wasteful and potentially harmful.

As ICU clinicians who often initiate these medications, it is incumbent upon us to contribute to resolving this issue.

ORIGINAL STUDY SUMMARY & PERSPECTIVE

Being Well While Doing Well - Distinguishing Necessary from Unnecessary Discomfort in Training (NEJM, 2024)

BY BHARAT BAJANTRI, MD. & DONNA COTA, MD.

Graduate Medical Education Corner

As our hospital transitions into a teaching institution, we emphasize the importance of integrating educational research into our internal journal. We explore adult learning theory to understand various teaching approaches, enabling educators to select methods suitable for different educational settings and learner characteristics. However, residents engaging in tasks traditionally considered non-educational, such as "scut work," face challenges in challenging this perception, reflecting broader tensions between traditional workplace demands and well-being. The emergence of a new social capital rewards those who voice grievances against demanding aspects of residency, but there's concern about trivializing serious issues by labeling every discomfort as "trauma." Reflecting on latest trends, educators question whether the pursuit of excellence in medical education conflicts with student well-being, highlighting the need for balance in supporting trainees while fostering excellence.

Current educators are reevaluating whether the drive for excellence in medical education clashes with the well-being of students. Despite the evolution of medical culture, the rise of online discourse has brought about new standards of performance, often favoring vocal critics over the majority. This trend can suppress diverse viewpoints and constructive criticism, as individuals fear backlash for appearing insensitive. While prioritizing student well-being is crucial, there's apprehension that excessive accommodation of discomfort might impede the development of resilience necessary for patient care. Striking a balance between supporting trainees and upholding standards of excellence presents an ongoing challenge in medical education.

ORIGINAL STUDY SUMMARY & PERSPECTIVE

Being Well While Doing Well - Distinguishing Necessary from Unnecessary Discomfort in Training (NEJM, 2024)

BY BHARAT BAJANTRI, MD. & DONNA COTA, MD.

Understanding tools to combat modern day challenges in medical education – Adult learning theory. None of them are deemed better than the other, some more useful than others depending on circumstances. Here are suggested theories/methods:

- Behavioral theories emphasize environmental stimuli shaping behavior, with reinforcements strengthening desired behaviors and negative consequences weakening them. Educators play a significant role in orchestrating the learning environment to elicit specific responses.

- Cognitivism delves into the learner's internal processes, focusing on mental and psychological mechanisms underlying learning, particularly in formal education settings.

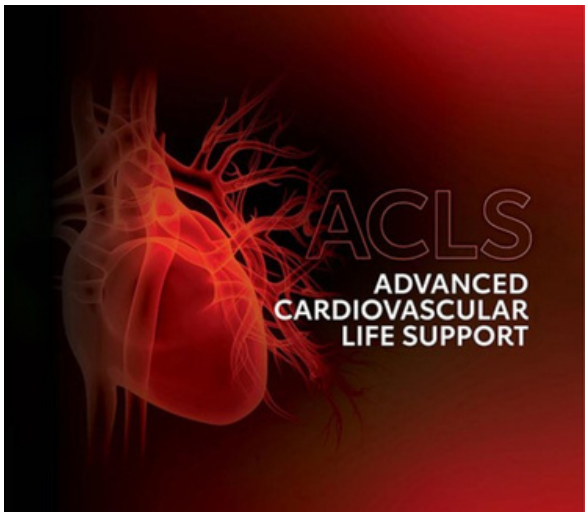
- Experiential learning emphasizes hands-on interaction with the environment, progressing through phases of concrete experience, reflective observation, abstract conceptualization, and active experimentation.

- Humanism promotes self-directed learning, emphasizing individual freedom and the ability to plan, manage, and assess one's own learning journey.

- Transformative learning challenges learners to question their assumptions and integrate new knowledge into existing frameworks.

- Reflective models offer opportunities for learners to evaluate experiences either after they occur (reflection on action) or during the activity itself (reflection in action), with success depending on the learner's capacity for reflection.

Key ACLS Best Practice Recommendations 2024



The AHA committee recommends the following:

Temperature Regulation:

- Administer temperature control to all adults who remain unresponsive after ROSC.
- Prioritize fever prevention (maintaining temperature ≤37.5°C) over lowering temperature, while aiming to maintain a constant temperature between 32°C and 37.5°C.
- If patients are hypothermic post-ROSC, rewarming should not exceed 0.5°C per hour.

Seizure Management:

- Conduct spot electroencephalography (EEG) instead of continuous EEG for post-cardiac arrest patients unable to follow commands.
- Consider a trial of a nonsedating antiseizure medication in patients with ROSC and EEG evidence of ictal or interictal waveforms.

Extracorporeal Membrane Oxygenation (ECMO):

- Utilize ECMO for resuscitation in specific patients under the care of trained clinicians and equipped healthcare systems.

Additional Recommendations:

- Avoid routine calcium administration for cardiac arrest.
- Discourage routine emergent coronary angiography post-ROSC unless patients display specific criteria such as STEMI, shock, electrical instability, significant cardiac damage, or ongoing ischemia; it should not be solely based on a shockable rhythm arrest.

SNAPSHOTS

COPD: Beat it with Beets!

Eleven studies involving 287 patients were analyzed in a meta-analysis investigating the impact of nitrates on Chronic Obstructive Pulmonary Disease (COPD). All studies except for one, including a large RCT (n = 165), included beetroot juice as the form of nitrates in the treatment group comparing with placebo. The findings revealed that dietary nitrate supplementation led to elevated plasma nitrate and nitrite levels, as well as fractional exhaled nitric oxide in COPD patients. Nitrate was also found to enhance exercise capacity [SMD = 0.38, 95% CI = 0.04–0.72], improve endothelial function [MD = 9.41, 95% CI = 5.30–13.52], and alleviate dyspnea in COPD patients.

In summary, the amalgamation of meta-analysis and network pharmacology uncovered that dietary nitrate supplementation improved exercise capacity, reduced breathlessness, enhanced endothelial function, and increased plasma nitrate and nitrite concentrations, along with FeNO levels in COPD patients. These mechanisms may be linked to AKT1, IL1B, MAPK3, and CASP3 pathways. Nitrate emerges as a potential treatment option for COPD patients; however, its long-term effects warrant further evaluation.

GRATITUDES

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