Among patients subsequently requiring crossover treatment, more patients had alternative initial IPET dosing (66%; 33/50) compared with standard dosing (34%; 17/50). For patients who received IPET management alone (i.e., no crossover), standard IPET dosing was more prevalent (63%; 130/205) compared with alternative dosing (37%; 75/205) (Figure 2).

**Management teams.** Most patients (86%; 484/566) were initially admitted to a medical service, 64 (11%) were admitted to a surgical service, and we were unable to determine the service in 18 (3%). Half of the patients admitted to the medicine service received IPET management (50%; 244/484), and half received surgical management (50%; 240/484).

Of those admitted to the surgical service, 95% (61/64) were managed by thoracic surgery versus general surgery (5%; 3/64), and 83% (53/64) received surgical management, compared with 17% (11/64) who received IPET management. The rate of CPSIs that were in the empyema phase was higher in patients admitted to the surgical service (61%; 39/64) compared with those admitted to the medicine service (41%; 197/484) (P = 0.002).

Of the 255 patients who received initial IPET management, 67% (171) had a surgical consultation. Of the 205 patients who received only IPET management, 60% (123) had a surgical consultation.

**Discussion**

Although surgery is currently recommended for CPSI management by national societies as of 2017 guidelines, we identified its use as an initial strategy to be decreasing in the community setting but still prevalent (2). This is likely due to more institutions adopting IPET. We identified that although IPET adoption has increased, the use of alternative IPET dosing has also increased and was associated with a higher frequency of crossover into the surgical intervention group. However, this study is retrospective and not powered to show a statistical difference in outcomes, thereby limiting our ability to identify why these clinical decisions were made.

A notable finding is that CPSI treatment type does not appear to be influenced by age or RAPID (renal, age, purulence, infection source, and dietary factors) score, as previous studies have suggested (4). Another is that more patients underwent surgery when the admitting service was surgical. This could reflect the higher rate of CPSIs in the empyema phase being admitted to the surgical service but could also reflect poor surgical candidates more frequently admitted to the medicine service, as well as variability in practice patterns and specialty bias given surgical societies recommending surgery as the primary management strategy (2, 5, 6).

With trends in the management of CPSIs shifting, these data demonstrate a need for randomized trials (NCT04095676, NCT03584113, and NCT03873766) to better develop systematic CPSI treatment plans.

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Candice L. Wilshire, M.D.
Anee S. Jackson, M.D.
Leah C. Horslien, B.S.
Joshua R. Rayburn, B.S.
Carson C. Fuller, B.S.
Christopher R. Gilbert, D.O.
Swedish Cancer Institute
Seattle, Washington

Najib M. Rahman, M.D.
Eliah Bedawi, M.D.
University of Oxford
Oxford, United Kingdom

Adam J. Bograd, M.D.
Eric Vallières, M.D.
Jed A. Gorden, M.D.*
Swedish Cancer Institute
Seattle, Washington

ORCID IDs: 0000-0002-3637-1802 (C.L.W.); 0000-0003-0683-9547 (J.A.G.).
*Corresponding author (e-mail: jed.gorden@swedish.org).

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**Can We Reliably Predict the Failure of Noninvasive Ventilation in COVID-19–associated Acute Hypoxemic Respiratory Failure?**

*To the Editor:*

We read with great interest the article by Bellani and colleagues, “Noninvasive Ventilatory Support of Patients with COVID-19 outside the Intensive Care Units (WARd-COVID),” published in _AnnalsATS_ (1). Without a doubt, this prospective study is one of the most important and largest published studies on the effectiveness of noninvasive ventilation (NIV) in coronavirus disease (COVID-19)–associated acute hypoxemic respiratory failure (AHRF). Bellani and colleagues demonstrated that NIV is feasible outside the intensive care unit (ICU) in COVID-19–associated AHRF, with an overall success rate of 65% and a 60-day mortality rate of 25%. The authors...
also showed that lower arterial oxygen pressure (\(P_{A\text{O}_2}\))/fraction of inspired oxygen (\(F_{I\text{O}_2}\)) ratio, higher CRP (C-reactive protein) concentrations, and lower platelet counts were independently associated with an increased risk of NIV failure.

However, we believe that using the \(P_{A\text{O}_2}/F_{I\text{O}_2}\) ratio is a rather questionable means of predicting NIV failure. First, \(P_{A\text{O}_2}/F_{I\text{O}_2}\) values are inherently inaccurate because the \(F_{I\text{O}_2}\) in a nonintubated patient is quite difficult to determine (2). And this is especially true in the context of non-ICU departments when using free-flow systems under the condition of a gas leak around the mask or helmet. Second, the \(P_{A\text{O}_2}/F_{I\text{O}_2}\) threshold of 150 mm Hg is also rather controversial. In a study by Franco and colleagues (3), there were no differences in the 30-day mortality rate between patients with COVID-19 with baseline \(P_{A\text{O}_2}/F_{I\text{O}_2}\) values of 101–150 mm Hg and patients with COVID-19 with baseline \(P_{A\text{O}_2}/F_{I\text{O}_2}\) values of 151–200 mm Hg (24% and 26%, respectively). Third, in two other studies (4, 5) conducted outside the ICU, the mortality rates of patients with COVID-19 with even lower baseline \(P_{A\text{O}_2}/F_{I\text{O}_2}\) values during NIV were better than that in the study by Bellani and colleagues: the rate was 17% in a study by Brusasco and colleagues (initial median \(P_{A\text{O}_2}/F_{I\text{O}_2}\) of 119 mm Hg) (4), and the rate was 21% in a study by Nightingale and colleagues (initial median \(P_{A\text{O}_2}/F_{I\text{O}_2}\) of 122 mm Hg) (5).

In our recent study, in patients with COVID-19 receiving NIV outside the ICU, the baseline \(P_{A\text{O}_2}/F_{I\text{O}_2}\) index also did not differ between the success and failure groups, but we found that patients who experienced NIV failure had lower PaO2/FIO2 values during NIV were better than that in the study by Bellani and colleagues: the rate was 17% in a study by Brusasco and colleagues (initial median \(P_{A\text{O}_2}/F_{I\text{O}_2}\) of 119 mm Hg) (4), and the rate was 21% in a study by Nightingale and colleagues (initial median \(P_{A\text{O}_2}/F_{I\text{O}_2}\) of 122 mm Hg) (5).

Bellani and colleagues also identified elevated levels of CRP as an independent predictor of NIV failure. Interestingly, in our study, an elevated d-dimer level was an indicator of the increased possibility of NIV failure (6). Both high CRP levels and high d-dimer levels are associated with the progression of COVID-19 and a higher mortality rate. So, progressive underlying processes in COVID-19 might need prolonged respiratory support and can be associated with NIV failure.

In conclusion, because the appropriate patient selection is the key to the successful application of NIV, further research is needed to identify reliable predictors of NIV failure in COVID-19–associated AHRF.

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Sergey N. Avdeev, M.D.*
Andrey I. Yaroshetskiy, M.D.
Galia S. Nuralieva, M.D.
I.M. Sechenov First Moscow State Medical University (Sechenov University)
Moscow, Russia

ORCID IDs: 0000-0002-5999-2150 (S.N.A.); 0000-0002-1484-092X (A.I.Y.).

*Corresponding author (e-mail: serg_avdeev@list.ru)

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