

A Simple, Life-Saving Protocol: Buccal Nitroglycerin Ointment for SCAPE and Acute Pulmonary Edema Without Cardiogenic Shock (Movahed Protocol)

Summary of a publication by Mohammad Reza Movahed, MD, PhD, FSCAI, FACC, FACP, FCCP.

In patients presenting with severe pulmonary edema, rapid deterioration can lead to intubation and mechanical ventilation unless immediate and effective intervention is taken. One particularly severe and underrecognized variant of this condition is Sympathetic Crashing Acute Pulmonary Edema (SCAPE), sometimes referred to as

flash pulmonary edema. Patients with SCAPE are often hypertensive, hypoxic, and in acute respiratory distress, yet notably, they do not typically present with cardiogenic shock. The key clinical opportunity is their elevated systolic blood pressure (SBP), which makes aggressive preload and afterload reduction not only feasible, but potentially lifesaving.

An article published in the *American Journal of Cardiovascular Disease*¹ presents a protocol developed by Mohammad Reza Movahed, MD, PhD, using repeated buccal administration of nitroglycerin ointment as a non-invasive, rapidly effective, and widely available alternative to intubation. Through a case series of six patients, all of whom presented with SCAPE or severe acute pulmonary edema and significant hypoxia despite maximal oxygen therapy, Dr. Movahed demonstrates that repeated $\frac{1}{4}$ to $\frac{1}{2}$ -inch (Figure 1) doses of nitroglycerin ointment administered buccally every 60 seconds

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can rapidly relieve respiratory distress. In each case, blood pressure was checked before each dose to ensure it remained above 120 mmHg. All patients showed rapid symptom resolution within 20–30 minutes, avoided intubation, and experienced no adverse events. (Figures 2-3).

The patient cases highlight different high-risk populations where this approach succeeded. In one patient with diastolic heart failure, intubation was avoided with complete resolution of symptoms after just 20 minutes of buccal nitroglycerin therapy. In another, post-coronary intervention pulmonary edema improved quickly, despite initial SBP of over 200 mmHg. Two patients were dialysis-dependent and developed pulmonary edema related to fluid overload or post-myocardial infarction; both recovered respiratory function without mechanical ventilation using this protocol. Another patient with acute nephropathy post-angiography similarly avoided intubation.

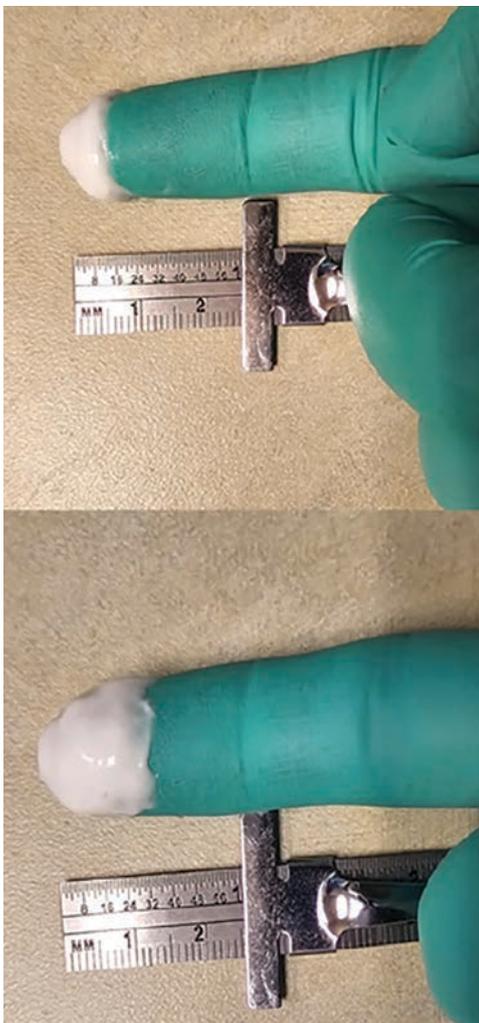


Figure 1. Simple use of nitroglycerin ointment using index finger for buccal administration

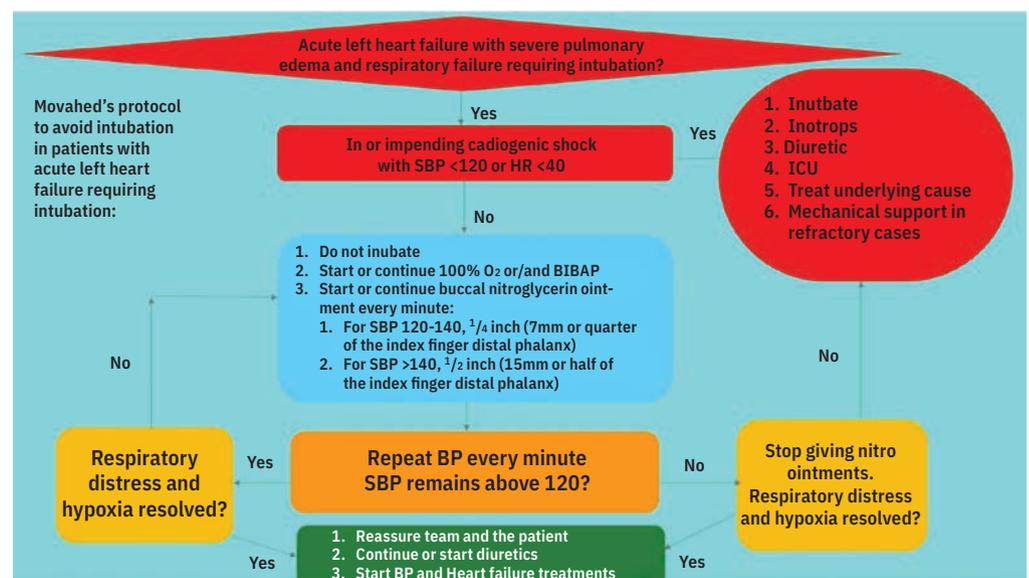


Figure 2. Comprehensive description of the Movahed protocol.

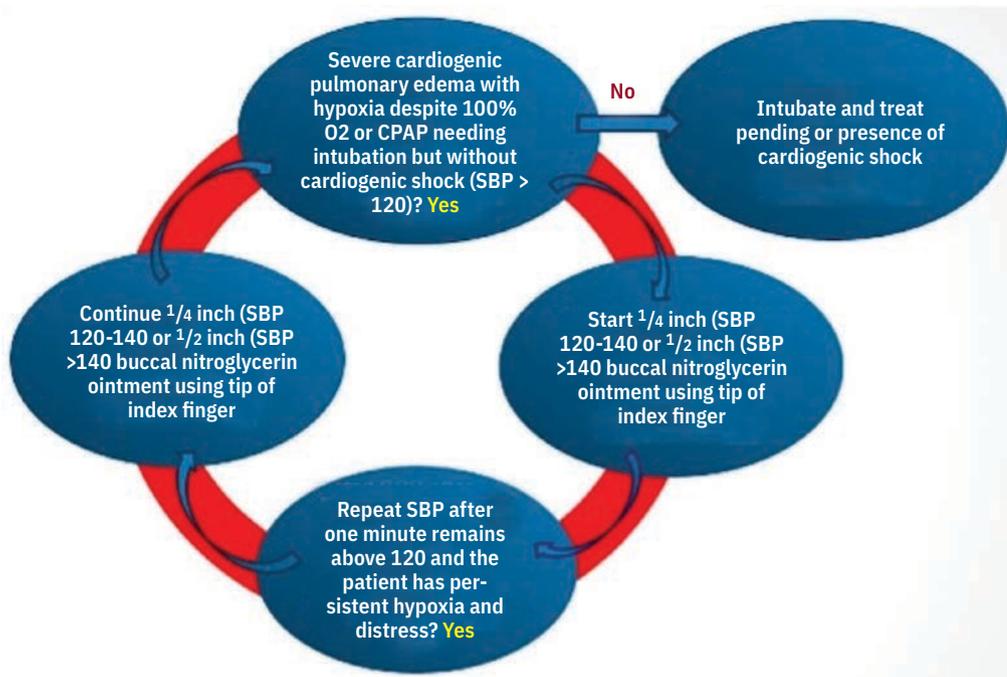


Figure 3. Showing simplified Movahed protocol.

The most important takeaway is that this method is simple, effective, and underutilized. It requires no intravenous access and can be done immediately at the bedside with readily available supplies.

These cases represent a mix of chronic heart failure, renal impairment, structural heart disease, and post-percutaneous coronary intervention complications, yet all responded positively to this straightforward therapy.

Dr. Movahed emphasizes that buccal nitroglycerin ointment is pharmacologically ideal for this situation: it is rapidly absorbed, produces strong preload and afterload reduction, and avoids the delays and logistics of IV

nitroglycerin infusion. Sublingual nitro, while more familiar, lacks the dosing power needed to reverse pulmonary edema quickly and is less effective due to dry mucosa in hyperventilating patients. In contrast, nitropaste applied to the buccal mucosa can deliver 6,000–7,000 micrograms per dose and acts within minutes.

The most important takeaway is that this method is simple, effective, and underutilized. It requires no intravenous access and can be done immediately at the bedside with readily available supplies. Monitoring SBP is critical to ensure safety, but when done properly, this protocol can dramatically reduce the need for intubation and its associated risks and complications.

Ultimately, Dr. Movahed argues that buccal nitroglycerin ointment should be considered a frontline therapy for SCAPE and acute pulmonary edema in patients without cardiogenic

shock, and that clinical teams should become familiar with this protocol as part of their standard emergency toolkit. ■

REFERENCE

1. Movahed MR. The Movahed protocol and algorithm for preventing intubation in patients with acute or sympathetic crashing acute pulmonary edema (SCAPE) without cardiogenic shock by repeated administration of buccal nitroglycerin ointments. *Am J Cardiovasc Dis.* 2024 Dec 15;14(6):368-374. doi:10.62347/CXMD7229

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Disclosures: Dr. Movahed reports no conflicts of interest regarding the content herein.

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