Discussion to: Assessment of Effectiveness and Safety of Thrombolytic Therapy to Pulmonary Emboli by Endobronchial Ultrasound-guided Transbronchial Needle Injection

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Dr. Patricia Thistlethwaite (San Diego, CA):

Congratulations on a very nice study and thank you to the AATS for allowing me to discuss this paper. Your group should be commended for developing a large animal model of pulmonary embolism. Many groups have tried to do this, and most have failed, so this, in itself, is a step forward. I have three questions. What makes your model better than just catheter-delivered thrombolytics through a Swan-Ganz line in the emergency room? It certainly seems like an easier way to do it rather than doing it via an EBUS approach. Now, perhaps the best comparator of your study shouldn't be systemic thrombolytics but should be catheter-based thrombolytics compared to your EBUS-based thrombolytics.

Dr. Yuki Sata (Toronto, Ontario, Canada):

Okay. Thank you for the question. So, actually there are guidelines that recommend that catheter directly provides tPA administration because catheter tPA administration makes the risk of bleeding is higher, so that's why we didn't compare with this treatment to catheter administration of tPA. So-- yeah, that's all right.

Dr. Thistlethwaite:

It's certainly the wild, wild west out there because I can say at least at our institution, the standard of care would be a catheter-based thrombolytic delivery. The concern really is, with increased PA pressures after an acute PE, bleeding from the puncture site, either into the mediastinum, into the airway, or into the lung, may be problematic. And if this translates to humans, this is particularly worrisome in people that have submassive and massive PEs because they're already on heparin or DOACs by the time that they would get to you. Can you comment on the bleeding risk, and how you would deal with the bleeding risk?

Dr. Sata:

Okay, thank you for the question. So, regarding the risk of bleeding, we can intubate, and so if needed, we can do surgery to stop the bleeding. So actually, when we proceeded with a clinical trial with this treatment, maybe we don't use anticoagulation before tPA administration because, as you know, the tPA administration in combination with anticoagulation makes the bleeding risk high, so as I presented these techniques effectively dissolves the clot and so it means, I think, so it doesn't need to tPA with anticoagulation therapy. So, after tPA administration, the concentration of tPA is reduced to four hours after tPA
administration. So, after this treatment, maybe we can provide anticoagulation direct four hours after tPA. Because the concentration of tPA is reduced 1/100 four hours after tPA administration.

Dr. Thistlethwaite:

Thank you. And finally, most people in the United States perform EBUS under general anesthesia or, at the very least, very heavy sedation. And this does carry some risk in people who have submassive or massive pulmonary emboli. And since catheter-based thrombolytics don't require this, but your procedure does, I'd like you to comment on the risk of anesthesia in the setting of a massive or submassive PE using your approach.

Dr. Sata:

Oh, sorry, can you please again?

Dr. Thistlethwaite:

Yes, most people do EBUS with the patient under general anesthesia, and that carries risk patients that are undergoing a submassive or massive pulmonary embolism that are hemodynamically unstable.

Dr. Sata:

Okay. Thank you for the question. I think that this technique may be able to perform without under anesthesia. So, we perform the EBUS-TBNA under mild sedation, and as so, maybe if the patient will be very emergent situation, we need intubation. But I expect this treatment will be possible without anesthesia.

Dr. Thistlethwaite:

Thank you very much.

Unidentified Speaker 1:

Just as a follow-up on that concept. So even if you did your EBUS under conscious sedation, you still have to mobilize an OR team, get to the OR, and get it done. And that's a time lag. These patients usually would get cath or infusions started in the ER, so to me, that's a big time sink. I love the idea that we're trying to expand the modality of EBUS. I love the concept. Just the practicality is the part. Is it practical to do this? What do you think about that?
Dr. Sata:

Thank you very much for the comment. I think so. So, if we can use this technique and that work, and so we can check if the crux is disturbed or not. And if not, we can proceed with surgery or something.

Unidentified Speaker 1:

And I missed it, but what size needle are you using to inject?

Dr. Sata:

So, to inject the tPA, we use 25-gauge.

Unidentified Speaker 1:

25, okay.

Dr. Sata:

Yeah. But to inject the crux, we use the 21 or 22-gauge needle.

Unidentified Speaker 1:

Into the clot.

Dr. Sata:

No, so the crux injection to create PE model.

Unidentified Speaker 1:

Could you ever withdraw and vacuum the clot with that needle? I mean, that’s what they do with transcatheter techniques. They use a vacuum system.

Unidentified Speaker 2:
One quick question. Paulo Carlos from the University of Sao Paulo. Enjoyed your paper very much and I followed the last paper on the model, so I'd like to focus on the model itself. So, my question is regarding the volume rendering of the clots that you used, right, for calculating volume and coming up with a comparison. So, what kind of software did you use and second, what kind of error do you expect when you do that? Because one thing is getting one solid mass and outline it and measure the voxels. The other thing is getting a stream of clots, they are not regular at all, right? And how did you do that?

Dr. Sata:

Okay. So, thank you for the question. I used 3D surgery software. This is free software that you can download it. Sorry, the second question is--?

Unidentified Speaker 2:

Just the accuracy. The precision of measurement.

Dr. Sata:

Accuracy. Actually, to be honest, maybe this surgery software is reported previously and as so, they provide how accuracy this software is. But accurate though, I don't know how. I wrote those paper using this software so that's why I believe this software, we can correct correctly.

Unidentified Speaker 2:

So, we had better check with the radiologist still. Thank you very much. Very interesting.

Thank you very much, Dr. Sata.

Dr. Sata:

Thank you. Thank you very much.