

Good morning, everyone. I'm Dr. Priya. Thank you to the organizers for giving me this opportunity to present this very good paper presented in WCLC this year.

We have got a lot of advances in surgery in the last two decades or so. So along with that, we also have, of course, advances in radiology. And this paper was to see whether AI-driven 3D reconstruction on the pulmonary surgery planning can be utilized better for lesser surgery.

This was a multi-center, multi-reader, multi-surgeon's trial which was carried out in the Peking University People's Hospital in China. Why do we need to know about this? The first three talks today were on epidemiology and screening. Basically, we are trying to identify, we are trying to diagnose and treat early lung cancers.

If we are going to try to diagnose and treat early lung cancers, we are also moving to the topics which Dr. Virendra has covered about sub-lobar resection, segmentectomy, wedge resections, whether they are going to come more and more in forti. When we are dealing with these two things like segmentectomy, sleeve resections, non-intubated VATS has come in now, patients are not intubated but they are undergoing segmentectomies and tracheal resections also.

We need to get the right kind of anatomical location of the disease. We need to have a perfect precision in the diagnosis as well as the management.

So the key question was if we have an artificial intelligence AI-aided 3D reconstruction images of the standard CT scan what we have, will it be clinically beneficial to diagnose more complex segmental variations of lung cancer? So the five radiology challenges which we have in the current CT scans what we have, one is diagnostic errors, which are because of it's

One is human error, we have overwhelming workloads, we have time constraints. I got my MRI cervical spine done six months back for something and actually I was told that you requested for this radiologist who does only neck, cervical spines and spine reporting. You will get the report after three days because she is busy and I was like okay.

So that is if I am a physician, I am a surgeon who is requesting for someone. So that is how the workload and the time constraints are going in our country. We have technological gaps we are really lagging behind and the cases are becoming more and more complex.

So if we want to do something like operate less, operate segmentectomies, operate sleeve resections and tracheal resections, we need to have better imaging guidelines. So this study was carried out in three centers in which there were three referees, three surgeons who were well trained, more than six years of experience in thoracoscopy and pure thoracic surgeries.

They were, they managed, they did the, I would say, correlation of the 2D scanning and the 3D reconstruction. They were the referees, the gold standard referees. And then they employed 10 surgeons. So there were 10 surgeons who operated a total of 400 cases of which 140 were taken for the study.

They were randomized between two groups, five surgeons each. They were first given a set of 2D reconstructions. So for four weeks, the surgeons, five surgeons were using the 2D and five surgeons were using the 3D AI reconstruction. And after around four weeks, they were switched. So there was a watershed area after four weeks.

So what did they see? The primary end point was the first accuracy of the anatomical variant identification because 2D CT is finally only two dimensional and we need to know the segments

proper if we need to do a segmentectomy. The secondary end point was the accuracy of the operation procedure selection.

whether a patient like Dr. Virendra has said will undergo a segmentectomy, oblique wedge, oblique lobectomy and so on and what was the time taken to plan the surgery. Okay, so these things were taken into consideration. The results showed a very good

the pro the AI driven 3D reconstruction, there was an 8% increase with a reduction of almost 40% in the error rates in accuracy of anatomical variant identification. That is, if you know the right side lung has 20 segments, the left has 19. So to identify the right segment, right location, whether one segment or two segments needs to be removed, that accuracy increased by 8% by using an AI driven 3D reconstruction images.

and there was also an 8% increase in selecting the appropriate resection extent when they evaluated with a 35% reduction in the errors. The time required to plan this surgery went down from 4 minutes to around 3 minutes so around 25% reduction in the time.

planning for a single surgery which sounds very which very sounds very small and what is the importance of three minutes and four minutes so in a place like Shanghai pulmonary hospital SPH where I went for a fellowship of uniportal vats they do 140 to 160 lung resections in a day

In a day if you are going to have 14 theatres doing 160 lung resections, you really need, you just have the 3 to 4 minutes to plan a surgery and go ahead. So they have these constant access to the 3D AI images wherein they can plan a surgery of segmentectomy very fast and segmentectomies are done rampantly in a place like SPH. It doesn't require a long list of planning or long many weeks of planning.

So 99% satisfaction rate was seen among surgeons when they used this model. Even in the subgroup analysis, there was an improvement across the variant prevalence as well as it was found to be more beneficial for the rarer kind of variants, rarer kind of locations for the tumors.

Even in the selection of operation procedure, the mistaken resection is I have seen this myself. A patient who was planned for surgery, a patient of ILD, the actual surgery, the segment removal was something else because everything looked diseased in that lung when they went in for VATS. And the final histopath had said no malignancy in the specimen. The original malignancy was still in the lung.

Thankfully they had a frozen section there. So mistaken resection was reduced by 73% by identifying it, localizing it, the tumor much better by a 3D reconstruction as well as the insufficient resection that is positive margins or less was reduced by almost 51%.

So the study did conclude that AI driven 3D reconstruction enhances the preoperative planning in lung cancer surgery by improving accuracy and substantially decreasing the error rates in anatomical variant identification and resection extent decision.

It is of greater benefit in anatomical variants. These things are very more important in the global absence of thoracic surgeons which are visible right now. There are 2 or 3 of us in the entire hall. So that does make it very important for poor surgeons like us.

We need more research to fully understand the potential and limitations of integrating it in our clinical practice. Hence, we need more such studies of multicenter, multireader or multicenter RCTs if possible with a well-maintained lung cancer database. So, thank you and let's go from 2D to 3D.