

Professor Jang-Ming Lee: how far will the robotic-assisted surgery go?

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Graduated from Medical School, and acquiring his PhD degree in the Medical Research Institute in National Taiwan University, Prof. Lee (*Figure 1*) is now the chief and professor of surgery in the Thoracic Surgical Division of Surgical Department in National Taiwan University Hospital. He is one of the important pioneers in the development of minimal invasive surgery in thoracic space in Asia. He possesses comprehensive understanding of both surgery development and medical environment of Taiwan. He is deeply devoted in development and education of minimally invasive thoracic surgery especially in the complex procedures including minimally invasive esophagectomy, robotic surgery or peroral endoscopic myotomy (POEM). He also actively participates in the editorial or review board in many distinguished international medical journals and has published more than 100 scientific papers. Elected as secretary in general of the thoracic society in 2013, he voices for the society to the government sector, policy makers, the patients and other healthcare stakeholders and leads the education of study for surgery in Taiwan. Due to his achievement in surgical spaces and thoracic education, he is now frequently invited for the lectures to share and to shape the future of the thoracic surgical field.

During the Shenzhen Surgical Forum held in October 2014, Prof. Jang-Ming Lee has two great lectures on robotic surgery and esophagectomy. As an experienced surgeon with profound study on pathogenesis and molecular epidemiology, how does he look at the robotic-assisted surgery? And what are his suggestions for a young surgeon about coping with the surgical complications? Let's enjoy the interview with Prof. Lee by *Journal of Thoracic Disease (JTD)* as follows.

JTD: *In your lecture on the Forum, you mentioned the robotic assisted surgery is feasible and also effective today. What are the main reasons that make you choose the robotic assisted surgery?*

Prof. Lee: The main reason why we choose robot is that its small ports are the most important part to provide the



Figure 1 Prof. Jang-Ming Lee, MD, PhD.

performance of complex procedures, and its instrumentation can be freely controlled by the surgeons because of the wrist. Usually we use our hands with our wrists and we use our wrists from our fingertip to the wrist, whose distance is maybe more than 20 cm. In the open surgery, you need the 20 cm depth of space to manipulate everything. But with a robot, just only a few minutes, a few centimeters (maybe just 2 cm) and the movement is much more freely than we do with hands. So less space is required for robotic accession. It is much less than handymen operation. The second reason is the scope system we use is 3-dimensional. From the 3-dimensional system you can very precisely access the vision, the space, the conditions and the distance. Hence, it can help you to get the precise dissection during the surgery. The third reason is that the scope can be totally controlled by the surgeon himself/herself. We know soft-scope operate requires a very vision and very capable

assistants. But sometimes the assistants do not know what the surgeon is doing or what the surgeon wants. It is very troublesome during the procedure. But using the robot, the direction, the depth and the angle, can be controlled by the surgeon, so it is the other advantage. These are the main reasons why we choose robotic surgery.

JTD: *Do you know the basic information about robotic surgery practiced in Taiwan?*

Prof. Lee: Until the end of the 2014. There were more than 10,000 cases of robotic assisted surgery performed in Taiwan, including 432 cases of thoracic surgery assisted by robotic system. For the field of thoracic surgery, the robotic assisted procedures included esophagectomy, thymectomy and pulmonary lobectomy.

JTD: *The cost of the robotic surgery is actually a bit high, right?*

Prof. Lee: Yes. One of the problems is the cost. Usually in Taiwan, each patient who has receiving robotic assisted surgery has additional pay for such instrumentation arranging in 5,000 to 8,000 US dollars. But compared to the other countries, I think the expense in robotic in Taiwan is much less. Such as in Korea, as my understanding, the cost imposed to the patient maybe higher than 10,000 US dollars. So the cost is also a main concern actually.

JTD: *Although robotic assisted surgery is still at the early stage of development, what do you think of its future development in next 20 years?*

Prof. Lee: Although there are some advantages, actually the robots are not perfect. There are some shortcomings. The most obvious one is some space required for the robot's arms. The conflict between each arm is still a problem. The robot arms cannot be too close to each other, otherwise they will be in conflict. If the setting is such as contusive occur the manipulation is quite difficult. So in the next generation, we expect the robot move more freely and the space not so large so we can put into small space. In the next generation, robots may be just put in small incision, just a combination of the single port in the robotic system. I think it is promising. But as far as I know, the single port robotic is remarkable already. But the instrumentation is still not so as we expected on the advantages. But I think it is moving in the right direction. We can expect that the next generation

would improve these instrumentations.

JTD: *Besides the robotic surgery, you also had a lecture on the complication of esophagectomy in this forum. To a green surgeon, do you have any experience to share about how to cope with complications?*

Prof. Lee: I think accepting is the most important issue on the procedure you adopt. Actually in the other sense, open surgery is quite safe because you can see and handle everything on sight and individualization. From the surgical part, for the young surgeons who try to endeavor the esophagectomy, I think it's better to equip themselves more familiar with the resident training in more institutes. Once he had the confidence in doing the usual lobectomy for lung cancer, even proceeding to the esophagectomy and reconstruction. Finally, the most difficult and important part is the anastomoses itself, which is much technical demanded. In the first and last stage, anastomoses are quite difficult in the beginning. So in Taiwan we also offer some web labs for young surgeons to practice anastomoses on a table with animal tissues. It is the two steps you have to equip yourself with another simple procedure such as lobectomy and the lymph node dissection. Once you are going to another procedure such as laparoscope gastric mobilization, and then are finally the anastomoses. Therefore, if having chance, young surgeons have better to go to a web lab and have some practice before really practice anastomoses on patients.

JTD: *As you are also interested in the pathogenesis and molecular epidemiology, what advantages does the deep knowledge of the two disciplines bring to your surgery and research?*

Prof. Lee: Yes, I did some studies about it. Actually my PhD thesis is about the epidemiology of the esophageal cancer in Taiwan. I am the first one in Taiwan to identify that in addition to smoking and drinking, the bitter nut is also a risk factor for Taiwan esophageal cancer.

As a matter of fact, I learned a lot from my PhD course during molecular epidemiology study for esophageal cancer. First, it helps me to identify who is the high-risk patient. To the high-risk patients I have to cooperate with the epidemiologists or the endoscopies to give a survey. Now under this risk profile, we have started several investigation programs to develop the diagnostic tool for the early-staged patients, because I am also interested in treating esophageal

cancer. The most effective way is to be treated in the very early stage, so we can handle with the endoscopic submucosal dissection (ESD) with photodynamic therapy or local treatment. If at the early stage, the patients can get rid of the diseases without any interference in their daily activities. It is the best way. So from the epidemiology study, it can help to identify a high-risk patient. Second, the study of statistical analysis helps me to conduct further clinical trial at the basic background study and clinical trial for more complicated diseases such as the surgery therapy and new

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therapy, and also the study in different surgical techniques. We have several studies ongoing in handle such terms.

JTD: Thank you very much!

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