JORGE GUTIERREZ-ACEVES: I want to make a brief discussion on what to do lower pole stones. The first thing you have to see-- and this is not a very new graphic. Even though you can see that, over the years, the incidence of lower pole stones has increased, compared to the other locations that we see in the kidney. So that means that we routinely, in a regular patient, not a complex case, we will find the stones in the lower pole.

What are the treatment options? The three known of use, shock wave, flexible ureteroscopy, percutaneous nephrolithotomy. And I'm going to speak first about the modifiers of stone-free rate. And there are three main things that you have to consider-- stone size, the renal anatomy, and the stone composition.

Related to the renal anatomy, this has been discussed years ago, or described years ago, for several investigators. And there are three major anatomical issues that you might often see when you want to treat the patient with shock wave. Number one is the length of the infundibulum-- I mean, the width of the infundibulum. If the infundibulum is too tight, less than five millimeters, the chances to pass the stone after shock wave is going to be low.

If the infundibulum is too long, more than 3 centimeters, the chances of passing that stone fragment is low. If the angle before the lower pole, or the lower calyx and the pelvis is more than 90 degrees, the chances to pass the stones is, again, low. So you want to see your CT and you want to understand this, in order to offer the patient to treatment or not.

The second thing is the composition of the stone. And this is related to Hounsfield unit. You have to be able to see what is the composition of the stone in your CT. And speaking about regular CT, for sure, a double CT will help us more a little bit understanding what is the composition of the stone. But just to be easy here, if you have a stone that the composition is above 1,000 Hounsfield unit, don't even try to do shock wave lithotripsy, because the chances of success are very bad.

If you have a stone around 600-- 500 is a good stone to do shock wave lithotripsy. The question is in between these two lines. 600, 700, 800, you need to see the different issues, speaking about anatomy of the kidney. And then you will make a decision. So again, the same thing. Chances to be stone-free are much better when the Hounsfield unit are less than 1,000. And again, if you have a stone that is above this number, don't even try to propose shock wave lithotripsy.

Now come a third important anatomical issue-- came some years after the initial describe-- and it was the distance between the skin and the stone. And if you have a distance more than 10 centimeter between the skin and the stone, no matter what angle you use to measure that, then again, the prognosis is less good.

So you can see here a relation between Hounsfield unit and stone/skin distance. When the Hounsfield unit is less than 900 and the stone to skin distance is less than 9 millimeters, then you have higher chances to succeed with shock wave lithotripsy. But if you see the opposite signs where the Hounsfield unit is above 900 and the stone/skin distance is more than 9 centimeters, then the chances to succeed is quite different. So again, the anatomical factors are important, the stone composition is important, and the size of the stone is also important.

From what I can tell you of many, many publications related to-- I think there are two real studies that came from [INAUDIBLE] study based in US. I was lucky to be involved in these two studies, actually. And number one is a so-called lower pole study group. And we published this in 2/01 in the journal.

And this study based to compare shock wave lithotripsy against percutaneous surgery. And we divided in three groups-- stones from 1 to 10 millimeters, 11 to 20 millimeters, and 21 to 30 millimeters. And what you can see in all the three groups, the success rates is clearly in favor of percutaneous surgery. If you want to consider shock wave lithotripsy for lower pole stone, the stone should be less than 10 millimeters. In between 11 and 20, or more than 20, the chances of a succeed with shock wave are real poor.

And then came this kind of a-- I really don't know who came with this. I think it was James Lingeman. I hardly understand this efficiency equation, but what I can tell you is, just think about stone-free and think about retreatment and auxiliary procedures. And what you will find is clearly that it's in favor of percutaneous lithotripsy. So less retreatment rate, significantly less, compared to shock wave lithotripsy. And again, this is especially speaking about stones larger than 10 millimeters.

So the conclusion of the study was clear, that shock wave lithotripsy, even when it's less invasive, is less effective than percutaneous lithotripsy, and especially for those stones greater than 10 millimeters. So you want to consider a percutaneous nephrolithotomy, even as a first choice of treatment, when you have a stone larger than 10 millimeters, or when you have one of these anatomical issues we were discussing earlier. So you can go straight ahead and suggest someone to go for percutaneous nephrolithotripsy.

Now, we present a second version of this study that was called lower pole study group. And the results were published five years later. And then we divide the Group 1 patients with less than 10 millimeter stones to treat between shock wave lithotripsy and ureteroscopy, and patients with stone above 11 millimeters and a maximum 25 millimeters for ureteroscopy or percutaneous nephrolithotomy.

This is a perspective randomized study that, probably, the downside of this study, the number are low. But you can see here, in terms of surgery time, yes, it was a little bit less for shock wave lithotripsy, compared to uscope in small stones. It was about similar time-consuming for perc or uscope in stones above 10 centimeters.

What about stone-free rates? Again, percutaneous shock wave lithotripsy was quite less efficient, compared to uscope. And when we compare in those stones above 11 millimeters, still, percutaneous surgery was clearly the big winner in front of uscope.

What about the need of second treatment? Again, the same thing. Shock wave lithotripsy, even for stones less than 10 millimeters, required much more second sessions or complimentary treatments, compared to uscopes. And uscopes, your flexible ureteroscopy inside the kidney, require much more number of cases, compared to percutaneous surgery. So the number of days till the patient get completely recovered, yes, it was a little bit better for the shock wave lithotripsy. But again, the results, in terms of success and retreatment, was clearly in favor of endoscopic treatment.

So what happened after 2/05, when we presented this second study for the lower pole? Anything new? We speak about shock wave lithotripsy, clearly, the answer is no. We don't have any new thing in shock wave lithotripsy. We don't have any improvement in technology. Unfortunately, we learned a little bit, basically coming from physicists who tell us how to treat better the stone. But we don't have any improvement in the end outcomes with shock wave lithotripsy.

We do have some improvement in flexible ureteroscopy. We were discussing this earlier this morning. We do have improvement in endoscopic devices, improvement accessory devices. And we do have some new things that we may discuss-- Dr. [INAUDIBLE] has already discussed a little bit about this in the morning-- related to percutaneous nephrolithotomy.

So what about the advances in ureteroscopy? Just to not be repetitive what I presented in the morning, I will just mention that even the fiberoptic technology, or the digital technology, offered now for any company, this better the flexion capability. And this is important to treat lower pole. So any type of stone you pick will have 270 degrees of flexion in both size. And again, this is digital technology, or fiberoptic technology.

We discussed in the morning that the digital technology now has the disadvantage-- the are big. They are still big scopes. They are coming smaller. I mean, they're wide. But again, the important thing to access lower pole is the capability of the flexion. And again, what you can see in the lower pole is much better, if you see them with digital technology.

Now, again, you need to consider that the flexion of the device will be reduced, whatever you use inside. So what you want to use is anything below 2.4 French. Probably consider something as big as 1.5, 1.8, in order to get almost maximum the flexion, and be able to pull the stone.

We were saying in the morning that it is nice, or really a recommendation, to reposition the stone. But if you want to keep alive your scope, don't forget to advance the laser fiber when the scope is not deflected. So you have to have the scope straight, advance the fiber, and then deflect the scope. Then, the second thing you want to do is always visualize the fiber. You want to see the fiber constantly when you're doing. The most frequent type of damage to the scope is lasing inside the scope.

And again, you want to reposition the stone. It's always better to work with the straight uscope. And the best thing is to reposition the stone from the lower pole to the upper pole, or to the pelvis.

This is one of the few studies in the literature from Schuster and Wolf, compared years ago. The difference for the resource-- when they repositioned the stone and when they just lased inside of. And what you can see here is, for stones less than 1 centimeter, significantly better result when they replaced the stone. And when the stone was larger than that, the result was even better, if the stone was repositioned. So you will protect the scope and you will have better results, if you reposition the stone.

Now, what about percutaneous? What do we have new? This is from a HSI group. How much do we need to dilate when we do a percutaneous surgery? Again, Dr. [INAUDIBLE] was speaking about this early in the morning. What you can see here is that, when they compared three different measurements, it seems that, if you dilate less than 22 French, the chance of bleeding are less.

So this has called an interest in publication recently. This [INAUDIBLE], which is the clinical research of the Endourological Society, present this paper based on almost 6,000 patients, coming from many, many, many sites in the world. Many of us have been included there. And what they present is kind of a controversial paper where they say that balloon dilation actually produces more bleeding than using Amplatz dilation.

Now, why is this? It's not probably the metal dilation, it's the size of the track. So therefore, we need to consider, if we're going to go through the lower pole, this miniaturization tracks. What it is. What means miniperc? What means microperc? I think nobody can answer this.

Usually, miniperc is something considered within 14, 16 French. Microperc, the idea of HSI, maybe 8, 9 French. So the thing is that you will use, instead of a regular 30 French Amplatz sheath, you're to use here a 16 or 18 access sheath. You can use them, but I mean just a short version of the urethral access shield. And then, you will use a modified small nephroscope. And if you compare the size of this miniperc with the regular size, you, for sure can anticipate that the risk of bleeding in the kidney is less.

So what are the advantages of the miniperc or the microperc? Less incidence bleeding. Less postoperative pain. Unfortunately, you are limited to removal of stone fragments. And I consider-- I think we presented this initial paper where we did 97-- it was 97, and the problem is still the same. How can we remove fragments? This is a big issue with these small tracts. So the incidence of stone-free is going to be less for miniperc and microperc, and surgical time is going to be more than that.

And then, again, quickly, this idea from HSI-- and this is what Dr. [INAUDIBLE] was speaking in the morning. The whole idea of this is all thin needle. That means that the microfiber-- this is a micro-optic fiber is going to be in the needle, integrated in the needle. So as soon as you are making the puncture, you are really, potentially, seeing where you are going. So this is a complete visual puncture of the calyx.

I think that this concept is great, in order to be sure where you are accessing the kidney, but probably not to remove stones. And even [INAUDIBLE] has, in his initial presentation, what you can see here is you cannot remove stone fragments at all. You have to lase them and just leave the fragments there to be passed. You don't have continuous drainage, therefore, you can increase the internal pressure. And as you can see here, the initial result are really not great. I mean, 70% stone-free. And even 30% of these patients need a re-dilation, or make the track a little bit bigger than that.

So in conclusion, I think that shock wave lithotripsy for lower pole stone is less invasive, but it's much less effective than percutaneous surgery, especially speaking about bigger stones. Bigger means more than 10 millimeters.

Shock wave lithotripsy is completely dependent on the stone size. And percutaneous surgery, on the other side, is independent of the stone size and the renal anatomy. It's much more effective. And if you want to go for a small stone, small, in between 1 and 20 millimeters, probably, you want to consider a miniperc or miniature size access to the kidney.

Uscope has been improving over the years. And it's clearly a better option for stones that are not good candidates for shock wave lithotripsy. And I think new technology, especially new scopes and the access sort of devices, will help us to treat better patients with a flexible scope.