Podcast: Minimally Invasive Spine Surgery
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Respondent: Hi, I'm Dan Sciubba, and I'm a neurosurgeon here at Johns Hopkins.

Interviewer: And I'm Elizabeth Tracey. Thank you so much for joining me today. We're going to be talking about minimally invasive spine surgeries, something that has tremendous appeal, I would think, for a lot of people. Tell me more.

(0:00:14) Respondent: These should have tremendous appeal, and the reason is that there's been a concentrated effort by surgeons and even patients, partly driven by patients, to really try to get the same type of procedure that they would have gotten years ago with a less destructive way. The way that I always describe this to patients is there's less "collateral damage." So in our bodies, we may have a pathology that's hidden away deep in our body, and in order to get to that area, we have to traverse or go across area of normal tissue. And the fact of the matter is that going across that normal tissue can have potential drawbacks.

So minimally invasive surgery doesn't necessarily mean a tiny, tiny incision, it can, but really the issue is that you're damaging less tissue locally and therefore hopefully just treating the pathology with the bad part and not really harming anything that's normal around it.

Interviewer: When you say "minimally invasive," would this necessitate then endoscopic surgery?

(0:01:02) Respondent: So endoscopic, meaning you are using a scope or you look through a small hole, and you can look around, is often done in the brain, and it's often done with the belly as we know a laparoscopic surgery. In the spine, we sometimes use endoscopes and sometimes we use microscopes. And really the issue is it's not necessarily that an endoscope makes it minimally invasive or that lack of an endoscope makes it not minimally invasive, but this is one of our many tools.

So for example, if you have an operation that traditionally was done five years ago with a one-foot incision on someone's spine, their neck or their back or through their chest or through their belly to get to the spine, now that may be done with a two-inch incision. Maybe we're using a scope, maybe we're using x-rays more. But the goal is really to hurt the normal tissues less. And if an endoscope is used, usually it is minimally invasive, yes.

Interviewer: We know that in neurosurgery, there's lot of technology, pretty sexy interesting stuff. Is that also employed in minimally invasive spine surgery?

(0:01:50) Respondent: Issue for this is that if one is not able to see all the anatomy with the naked eye while making a very large incision in someone, they have to make up for that by using another type of technology to make up for things that one can't see. And if one weren't to do that, in order to see a very small area, one may have to use other cameras or other x-rays, so we'll use things like thoracoscopy which is looking at x-rays, so we can see bones without actually having to see them with our naked eye.

We can also use things called navigation. Now navigation is used in the brain, and it's in the spine. What we do is correlate that patient's images with a computer just like satellites correlate a person's car with known maps. And so this way, we can actually use almost like a GPS system in the spine to navigate even if we can't see it because we've worked it out before. And we are getting better and

better at that, and that allows us once again not to have to expose everything surgically to see everything, and use the maps, the smart maps, that help guide us.

Interviewer: I would think that would also help in the preservation of function because as we know, all of the nerves that let us clinch our hands or talk or do whatever have to go through that spinal cord.

(0:02:51) Respondent: Exactly. So if you had a very large spinal fracture or part of the spine that was compressing the spinal cord, and it was that one little area covering an inch, sometimes the procedure necessitates that we have to stabilize that with screws and rods, and that has to span many levels above and many level below. And I'm telling you that minimally invasive may still be the case, but instead of exposing all that normal muscle tissue to put those screws, and maybe we can put those screws in with little tiny incisions. And in that way, that will save all the normal muscles, the normal joints and potentially put other nerve structures at less risk because they're not being exposed.

Interviewer: The utilization of screws and rods and so forth, is that reduced with minimally invasive surgery in general or not really?

(0:03:31) Respondent: In some cases, it is, and some cases, it isn't. So in some patient who maybe has a large fracture where you definitely have to restabilize their whole spine, you still would use the screws but maybe you can put them in through smaller incisions, so the wound heals faster and the patients goes home soon. In some cases, we as a field did not like to go through the chest or the belly because it traverses all these normal structures like our abdominal organs or our heart and our lungs. And so we decide to go in the back and as a result, had to do a larger operation.

But now we have smaller safer ways to go through the front, and that sometimes allows us to do a smaller overall procedure. In those cases where one can go in the front in minimally invasive, it sometimes obviates the need for screws in the back. So it can make it smaller.

Interviewer: Wow, so this does sound like a tremendous advantage to me because I guess one of the things I've heard about these types of stabilizations in the past is that they can render the spine much more rigid and prone to injury over the long haul.

(0:04:19) Respondent: Correct. Spinal fusion surgery is not necessarily a good thing to hear associated with back pain, problems down the road, implants that may fail. And these are all risk factors that have to be talked about whether it's open or minimally invasive. Every time I finish an operation, I say, "How can I make this less invasive for my patients, for myself?" and the technology is following suit in helping us with this.

Interviewer: Would a smaller incision and a smaller surgical area make PT [physical therapy] a whole lot easier to do after someone has surgery?

(0:04:46) Respondent: If you need a big operation, whether it's open or minimally invasive, there's still probably going to be a significant amount of healing and a significant amount of risk with that operation. But we've seen patients go home sooner; they have less blood loss, a shorter hospital stay, and they often get back to their normal function sooner. And that's been shown across many studies including our own. So if you're sitting there and even just saying, "You know in two years, maybe this patient will be about the same," it still makes the point that we should be pushing this envelope. The question is would I want it. If it's safe and appropriate, I would say have a minimally invasive approach if possible.

Interviewer: What are the characteristics of someone who could consider minimally invasive surgery as opposed to one of these other operations?

(0:05:21) Respondent: Traditionally, minimally invasive was really done for more the bread-and-butter type of spine in cases that we do in this country, pinched nerves or low back pain, and this is where the technology first came out. And so early on, let's say if you asked me this five years ago, I would say patients with spinal tumors, they're not an option. People with deformity, meaning a scoliosis curve or a hunchback, they cannot. But it really comes down to what do they need and having a discussion with the patients.

Interviewer: What would your recommendation be for somebody who is told, "Hey, you're going to need this kind of surgery, and there's two approaches we could take, a traditional open or minimally invasive," how could they find somebody who does minimally invasive?

(0:05:55) Respondent: In general, one wants to always go to someone, #1, that they feel comfortable with. So deciding on if and when surgery here is an option, one has to feel comfortable with that person. That may come through the internet that may come through referral but it always comes down to the litmus test of how that patient feels with that doctor. The second issue is one wants to always consider someone who does do both. So I always make the comment to my patients that I drive stick and I drive automatic, and that is a literal and a figurative issue.

But the comment is that I don't feel like I have to force them to have an open because that's the only thing I do, and I also don't feel like I have to force them to have minimally invasive because that's my agenda where I want to do things small. They get the appropriate treatment. Now the fact of the matter is that no matter who they are, they're always going to be in my mind pushed towards something that I think is less destructive for them.

Interviewer: You see example of osteoporosis and people who have osteoporosis, then you can't really see that until you get in there. That's of course an increasing number, and I suspect perhaps also an increasing number of the patients you see because we're all aging successfully to a place where we might need you, but we would also have preexisting osteoporosis. What then?

(0:06:55) Respondent: Patients are getting older, and they are living longer, and osteoporosis is a big issue in this country. It makes spine surgery complicated. When we have to put an anchor point, screws or implants, and they don't grab on the bone as well, I often tell patient sometimes the treatment can be worse than no treatment when it comes to surgery. And it's something that I agree with you, we have to do better and better in terms of seeing our patients and making sure that they are checked before we do anything.

Interviewer: Let's go to the other end of the age spectrum. You mentioned that even scoliosis may be appropriate for minimally invasive approach.

(0:07:26) Respondent: So the reason I said that and you picked up on it was that you can imagine that a patient has something in their spine that is just in one little area, right in the middle of my neck or right in the middle of my low back, a scoliosis or what we call deformative spine covers the entire spine. So I always tell patients if we try to fix a scoliosis, it can't be fixed. For example, if you look at the Leaning Tower of Pisa, you can't just say to me, "Can we fix half of the basement floor?" No, you really can't; you really have to almost take the whole spine or the whole building and structure and really look at it as in a complex thing. And as a result, you might have to treat the entire issue.

Where for one of the windows that's out on the third floor, yeah, you can treat that focally. So when I say even scoliosis, the question is, "Well, how do we do something minimally invasive that by nature covers the entire spine?" What we can sometimes do is instead of exposing that is opening the patient so they have a wound that is foot and a half long. Maybe we can make smaller incisions and go to the area of the worst curve and do a small incision there and then go to the area of other parts and put very small incisions and then recorrect the patient in the operating room by just using a small incision and fixing their deformity in that way, even scoliosis because this has been such a hard way to approach it. Fundamentally, all of us think we have to see the whole spine to do it, no, not necessarily anymore.

And the same thing is true of tumors where a physician would say, "We have to see the whole tumor," not necessarily. What if a tumor is the size of your fist or the size of a grapefruit, do I have to see that whole thing? No, maybe I can make a one-inch incision, get into the middle of it, core it out, shrink it down and then treat the other parts of spine as needed. So this is why spinal tumors and spinal deformity or scoliosis has been the last bastion of treatment of minimally invasive. And we're finding with technology that we can be focal and even in that, take a very large curve and turn into something that's not as bad.

Interviewer: Very good. What else would you like to add about minimally invasive spine surgery?

(0:09:04) Respondent: The good news is that it's becoming more and more prevalent, and I think that patient should explore. They should look at physicians who consider doing both. The other side is that moment of caution that patients who have big problems may still have to undergo a big surgery. And although that surgery may be less invasive, may have smaller incision, it still may have significant risk. So what I don't want to have people coming from this discussion saying is, "Oh, I can have this minimally invasive," and I'm basically undergoing a pedicure or a manicure, when in reality, I'm still undergoing something that may effect my life; I may be paralyzed from this; I may have risks that are very, very real.

I may have to think about that before they embark on any major surgery whether it's open standard or minimally invasive and have a very clear discussion with their doctor about what those risks could be. And if they are not getting that, then they should definitely search that because what I always feel patients have to hear all that before they embark on something that might take their life or live with the significant complications. So minimally invasive is the next step. It is where we have to go, and it is where we're going to get better on but always, always realize this is major surgery.

Interviewer: Excellent. Thank you so very much.

(0:09:59) Respondent: Thank you for having me.