

Editorial

The American Association of Neurological Surgeons (AANS) Suspends Surgeon for Arguing Against Unnecessarily Extensive Spine Surgery; Was this Appropriate?

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Received: 12 December 18 Accepted: 12 December 18 Published: 27 December 18

In my last editorial, I opined that the American Association of Neurological Surgeons (AANS)' Professional Conduct Committee (PCC) policies can have the effect of deterring surgeons from testifying for the patient/plaintiff.^[1] It is my opinion that their proceedings resembled both a Kangaroo Court (i.e. gives the appearance of a legal proceeding, but they are perverted), and a Star Chamber (i.e. secret and arbitrary). Here I describe my own experience with the AANS' PCC and Board of Directors, and offer my opinion as to what you should do if you have testified for a patient/plaintiff, and are accused of violating the AANS's Code of Ethics and Expert Witness Rules.

MY EXPERIENCE WITH THE AANS

In January 2017, I testified at trial, as the plaintiff's expert, that Dr. A, the defendant, should not have performed a right-sided minimally invasive transforaminal lumbar interbody fusion (MI TLIF) in this particular patient. She was a 65+-year old, hypertensive, osteopenic, inactive, obese female with mild radiculopathy attributed to mild/moderate L4-L5 spinal stenosis and grade I degenerative spondylolisthesis (no motion on dynamic X-rays). I opined Dr. A should have performed a simpler, less risky procedure, consisting either of a decompressive laminectomy or laminectomy with non-instrumented fusion. Notably, the operation was actually performed by his partner, Dr. B (his co-defendant), whom the patient only met the morning of surgery. Dr. B had neither spoken to the patient or previously examined her. The patient woke up with a new, and permanent, right-sided foot drop which the surgeons attributed to a stretch injury.

In August 2017, I was accused by Dr. A, the defendant in the law suit, of violating six of the AANS' Code of

Ethics and Expert Witness Rules. The PPC decided the grievance warranted a hearing.

I decided to fight these charges. First, in my response to the PCC, I detailed why these charges were without merit (see Appendices 1 and 2 below for more detail). Second, I brought a counter complaint/grievance against the surgeon, Dr. A, who had filed the complaint/grievance against me. My complaint against Dr. A included evidence that there was: inadequate informed consent; evidence of double-billing as co-surgeons to Medicare; and that the actual operation was performed by Dr. A's partner, a neurosurgeon, whom the patient only met the day of surgery, resulting in a new profound and permanent foot drop.

The PCC Hearing in April 2018

As part of my testimony in support of my grievance against Dr. A, I brought the patient and her sister to

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Access this article online	
Quick Response Code:	Website: www.surgicalneurologyint.com
	DOI: 10.4103/sni.sni_423_18

How to cite this article: Epstein NE. The American Association of Neurological Surgeons (AANS) Suspends Surgeon for Arguing Against Unnecessarily Extensive Spine Surgery; Was this Appropriate? *Surg Neurol Int* 2018;9:265.

[http://surgicalneurologyint.com/The-American-Association-of-Neurological-Surgeons-\(AANS\)-Suspends-Surgeon-for-Arguing-Against-Unnecessarily-Extensive-Spine-Surgery;-Was-this-Appropriate/?](http://surgicalneurologyint.com/The-American-Association-of-Neurological-Surgeons-(AANS)-Suspends-Surgeon-for-Arguing-Against-Unnecessarily-Extensive-Spine-Surgery;-Was-this-Appropriate?/)

testify at the PCC meeting in April 2018. By the way, I believe this set a precedent that I strongly suggest others should follow.

Without going into further detail here, which can be found in Appendices 1 and 2, the PCC decided that I violated two of the Expert Witness Rules, and recommended suspension for six months. I contended, and still contend, that the evidence did not support either of these so-called violations—more about this below. On the other hand, the PCC dismissed the entire counter grievance I brought against Dr. A.

My Appeal to the AANS Board of Directors

On Nov. 16, 2018, I appeared before the AANS' Board of Directors and argued my case. Appendix 1 is the text of my presentation to the Board; and, Appendix 2 is my letter submitted to the Board in September, 2018 for their consideration at the Nov. 16, 2018 "hearing". Names were redacted in both Appendices.

The AANS Board of Directors' Decision

Recently, I received the AANS Board's decision. First, the Board adopted the recommendation of the PCC re 6 months suspension by an 11-1 vote. I asked the AANS counsel for the name of the person who voted against the PCC recommendation. I was told – you guessed it—IT IS SECRET, in contrast to routine court proceedings. Second, they completely dismissed my counter grievance against Dr. A. In my opinion, the AANS appears to have no problem with Dr. A's practices: lack of informed consent; double billing as co-surgeons to Medicare; and having a surgeon appear the morning of surgery who never saw or examined the patient previously, and performed an unnecessarily complex procedure in this patient.

Lessons Learned

First, in my personal experience, the AANS, my organization for over 34 years, protected the defendant neurosurgeons, and attacked the neurosurgeon (myself) who testified for the patients/plaintiff. In my testimony, I had fully disclosed all of the relevant facts from my review of the literature in this case. (See also my editorial about why I testify for the plaintiff.^[2]) In short, I had not violated any of the AANS Expert Witness Rules or Code of Ethics, and further, had been allowed by the judge based on the 702 Federal Rules of Evidence, to express my opinion (see Appendix 1 and 2). Rather, in my opinion, Dr. A had violated multiple AANS Expert Witness Rules and Code of Ethics, but yet the PCC found against me, and not him.

Second, my initial impression that this was a Star Chamber was truer than I had thought. The PCC hearing was secret and closed. I was not allowed to bring anyone to witness the entire proceedings, except a lawyer—which I chose not to retain for this purpose.

The transcript of the proceedings was made available to me, Dr. A, the members of the Board and PPC, but to no one else, -- not even other AANS members. In addition, I was told by the AANS legal counsel, via emails, that members did not have access to information such as the number of past cases heard by the PCC, the nature of the grievances, or the outcomes, etc. Again, like a Star Chamber, --secret, --secret, --secret. In addition, I requested information about the financial disclosures concerning ties to industry of the members of the AANS' PCC and Board. The AANS counsel informed me, via email, that this information was also not available to me. As you will see if you read Appendix 1, I ended my statement to the Board by asking a member of the Board, Dr. X, to recuse himself. He had trained Dr. A! And, had received millions of dollars from a prominent instrument company! That company, in fact, manufactures the TLIF, which I testified, should not have been used in this case. Furthermore, in my presentation to the PCC in April 2018, I had previously pointed out that this member of the Board had a clear conflict of interest due to the above. Like a Star Chamber, but unlike a court of law, apparently no one, including the AANS legal counsel, asked this person to recuse himself. In response to my charge of "conflict of interest", Dr. X said he would recuse himself and not vote; he did not, however, leave the room.

Finally, I would not advise anyone to go through what I faced over the last 15 months. Untold hours were spent preparing: 1. the response to Dr. A's charges; 2. the counter grievance against Dr. A; 3. my presentation to the PCC in my defense; 4. my presentation to the PCC re charges against Dr. A; 5. the appeal letter to the Board; and 6. my presentation to the Board. (The last two can be found as Appendices 1 and 2.) I decided to do essentially all the work myself with help from my husband, a professor at Columbia University with over 30 years of experience on boards of non-profit organizations (e.g. Association for Research in Vision and Ophthalmology, Brown University, Harry Frank Guggenheim Foundation, Smith College). Even so, initially we spent about 20K on legal advice to understand the AANS procedures, etc., Had we used a lawyer throughout, the bill would likely have exceeded 100K.

Further, in addition to the lost time and money, I was subjected to abusive and hostile questioning at the PCC hearing. In fact, even when questioned about my counter grievance, the PCC attacked me, instead of questioning Dr. A's behavior.

Additional Background

The PCC appears to only consider grievances that are brought by a member. Here, Dr. A, attacked me, someone equipped to fight back. That is, I have a detailed grasp

of the relevant evidence-based medical literature, and extensive credentials as a spine surgeon [in my case, over 300 peer-reviewed publications; Clinical Professor of Neurological Surgery at Stony Brook; and on the editorial boards of *Spine* (since 1990), *Journal Spinal Disorders Techniques* (since 1990), now *Clinical Spine Surgery*, *The Spine Journal* (since 2001); and Editor-in-Chief of *Surgical Neurology International* (since 2017)].

Should You Do if a Grievance Is Filed Against You?

Ignore the AANS and PCC completely and let them do what they want:

So what if they censure, suspend or expel you? In fact, it is not even clear who will know. Initially, I couldn't find notifications even after searching the Internet. I finally learned it is published at AANS Neurosurgeon (<http://aansneurosurgeon.org/>). I had never read this before, have you?

Resign from the AANS?

I don't need the AANS? Do you? In fact, I intend to resign once this issue is resolved. I do not want to be a member of a society whose policies in regard to legal testimony I cannot support.

Sue the AANS?

You might ask, why not sue the AANS? First, it is not easy to prove damages. Further, the courts so far have given wide latitude to professional organizations as indicated by the opinions in two failed suits against the AANS in which surgeons were respectively suspended or censured. See [*Austin v American Association of Neurological Surgeons*, 253 F3d 967, 968 (7th Cir 2001)] and [*Barrash v. American Association of Neurological Surgeons*, F3d (5th Cir. 2016), 2016 WL 37413].

Final Thoughts

I would welcome the AANS' response to this Editorial and others' I have published in *Surgical Neurology International*, and welcome readers' comments. The purpose is to shine the spotlight on the AANS' policies and procedures regarding expert testimony in malpractice cases, and open them up to transparent discussion. By the way, the membership of the PCC and Board can be found at www.aans.org/en/About-Us/Governance/AANS-Committees.

As I said to the AANS at the Nov. 16th meeting, this is no longer about me. I told them, "In fact, this is now about YOU, and it is now about what the AANS stands for. What is the message YOU want to send regarding the purpose of the AANS Expert Witness Rules and Code of Ethics? Is it designed to improve patient care or to, simply, intimidate neurosurgeons so as to discourage testimony against other neurosurgeons?"

REFERENCES

1. Epstein NE. Editorial: It Appears the American Association of Neurological Surgeons (AANS) Seeks to Limit Members from Testifying for Patients/Plaintiffs Through Proceedings Resembling a Kangaroo Court and/or Star Chamber. *Surgical Neurology Int.*, 2018; (in press).
2. Epstein NE. Editorial: Why I Testify For Some Patients/Plaintiffs, and Against Some Doctors/Defendants. *Surgical Neurology Int.*, 2018; (in press).

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Journal or its management.

Appendix 1: My statement to the Board of AANS on November 16, 2018

It would take me hours to fully discuss all the relevant information here. Fortunately, you have all this material which I assume you have read, so I will briefly make several points.

First, I want to point out that I do not testify for a living. I am a surgeon first and foremost- I don't enjoy being in court and I still love being in the OR. Further, I would not have testified for this patient 15 years ago. In fact, for many years, I only testified for the defense, as I believed then that a neurosurgeon should not testify against another neurosurgeon. But I became sick of seeing how many patients were being damaged by unnecessary, inappropriate, and/or negligent surgery. So, for the last 10 years, I have testified in cases in which I believed the plaintiff was a victim of --- **unnecessary, inappropriate, and/or negligent surgery**. In THIS case, the patient had an operation, a MI TLIF, that was **inappropriate/wrong for HER**, and she ended up with a permanent deficit *that has ruined her life*.

In fact, in Dr. A's own words there was no evidence she needed a TLIF/MI TLIF Fusion.

Dr. A's Deposition 5/1/13 Pg. 65 Lines 21-25: "That she had mild to moderate stenosis, that the sagittal T2 does not demonstrate the amount of stenosis that I see on axial T2 images and there was no movement on the flexion extension and her bone scan was negative."

Second, the case against me is without merit. You just heard that there are two remaining complaints against me. One, **Violation of AANS Expert Opinion Rule A.3. (The neurosurgical expert witness shall identify as such any personal opinions that vary significantly from generally accepted neurosurgical practice.)** First, I maintained in my testimony, and still maintain, that in my opinion, the MI-TILF was not the right operation for this patient, even though many other surgeons may have done this procedure. In fact, I still maintain that many surgeons would NOT have performed this operation ON THIS PATIENT. NOTE: Dr. C from Hospital for Special Surgery (HSS) was going to do a laminectomy alone, which is the SAME operation I thought - and still think - this patient should have had.

In addition, if you read the complete trial testimony, --- and you can't make an informed decision today without reading all the information available to you, --- I made it clear it was my opinion. The PCC, Dr. A, and his lawyer, cherry-picked portions of the testimony. Further, the Judge stated at trial, "Here I find that the doctor is an expert in her field of endeavor so she'll be permitted to give you her opinions on that subject." In fact, the judge permitted me to testify regarding my opinion based upon the guidelines expressly set forth in the New Jersey Rule of Evidence 702, which mirrors the Federal Rule of Evidence 702. That is, according to the judge, I was qualified by both the New Jersey State and Federal Rules of Evidence to be an expert and to give expert testimony pursuant to the rules which state, and I quote: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education may testify thereto in the form of an opinion or otherwise." N.J.R.E. 702. Thus, by its very language, a witness may qualify as an expert on the basis of only one of the following: knowledge, skill, experience, training *or* education. And, may express her opinion.

The second charge is: **Violation of AANS Expert Opinion Rule A.4. (The neurosurgical expert witness shall recognize and correctly represent the full standard of neurosurgical care and shall with reasonable accuracy state whether a particular action was clearly within, outside of, or close to the margins of the standard of neurosurgical care.)** The PCC charged that I, ". did not acknowledge that such procedures are generally accepted practice and, therefore, the PCC did not believe that her testimony correctly represented the full standard of neurosurgical care." **In fact, a complete reading of my trial testimony will indicate that I did acknowledge that there was a range of approaches.** Again, although you need to read the full testimony, here are some relevant excerpts:

Dr. Epstein's Trial testimony Pg. 109, Lines 6-14

Dr. Epstein: People do things differently. If they are doing the procedures and the complications are over and above what they should be, then those procedures have to be reexamined, and the indications and the reasons for doing them have to be reassessed.

Epstein Trial testimony pg. 111,

Question, Pg. 111, Lines 8-10: You would agree that, in this country, there are many leading medical schools that teach their residents to do TLIF procedures, correct?

Epstein Line 11: Yes

Epstein Trial testimony Line 16-19

Question: You would agree that in NYC some of the leading orthopedic and neurosurgical centers have surgeons there that do TLIF procedures correct?

Line 15: Epstein: Yes

Epstein Trial testimony, Pg. 109 Line 15: Pg. 110 Line 3:

I am testifying that in this case this was not the best operation for this patient, and did not rule out that reputable spine surgeons could choose to perform TLIF.

According to the AANS Expert Witness Rules, this Board must decide whether my expert opinion was honest, transparent, and supported by documentation, not whether a MI-TLIF was the standard of care in this case. To do otherwise, you would be going beyond your prescribed responsibility, and, in effect, would be determining the standard of care and imposing it on all our members, -- many of whom maintain valid opinions to the contrary. There are other options favored by experienced and caring physicians that are valid-- and worthy of expression in a legal dispute. In fact, the AANS guidelines number 9, acknowledge a range of acceptable treatments for lumbar spondylolisthesis and I quote, "An elderly patient with a collapsed disc space and a relatively fixed deformity would likely do well with a non-instrumented fusion. The influence of spinal alignment, local anatomic features, osteoporosis, and patient demand, (i.e. activity level and age) cannot be overstated". This patient was an obese, osteoporotic, hypertensive, and an inactive 66 year old female.

In short, I can **ONLY** be accused of telling the truth about what I have seen, and still see, in my practice of neurosurgery and what is supported currently in the literature. (BTW, I quote this literature in the documents you received, particularly my original response to the grievance. Again, please read this material.)

My third point speaks to the purpose of these proceedings. They appear designed nearly entirely to deter neurosurgeons from testifying against another neurosurgeon. To test this hypothesis, I asked the legal counsel of the AANS to provide the information about the number of cases heard by the PPC, the reasons for the grievances, and the outcomes. I suspected that these cases were overwhelmingly brought against plaintiffs' experts. Unlike a court of law, I was told even AANS members cannot have this information. This is more like a Star Chamber (i.e. secretive, oppressive and arbitrary) than a legitimate proceeding.

However, a 2007 letter to the editor of Neurology Today provides an answer to my question. Dr. Iverson, a neurologist, wrote: (quote) 'Our neurosurgical colleagues at the American Association of Neurological Surgeons (AANS) received 50 or 60 complaints and have censured, suspended, or expelled 36 members in the last 23 years. In 14 years the AAN (American Association of Neurology), with two and one-half times the membership of the AANS, has censured one member and suspended or expelled none.' Dr. Iverson took these data as 'damning testimony regarding the ineffectiveness of the current AAN grievance process'. His comments, however, speak to the underlying motive behind these grievance proceedings, and support my claim that the purpose of the AANS is to intimidate neurosurgeons from testifying against other neurosurgeons. Note somehow Dr. Iverson was given access to the information that was denied me.

If I am being unfair, then I invite the AANS to prove me wrong, by providing data for at least the last 20 years of those who have been brought before the Professional Conduct Committee (PCC).

I brought a counter grievance against Dr. A to test my hypothesis that the PCC is not interested in grievances against neurosurgeons, unless they are testifying against other neurosurgeons. In particular, I provided evidence that there was inadequate informed consent, at best questionable Medicare billing, and that the actual operation was performed by Dr. A's partner, a neurosurgeon whom the patient only met the day of surgery and gave her a footdrop. The PCC COMPLETELY dismissed all of these counter grievances. [BTW, Dr. D, a member of the PCC, even defended the practice of a surgeon not seeing the patient before the day of surgery (See Transcript of PCC Hearing April 2018 pg. 95)-- Is the AANS really saying, it is okay to operate on a patient without seeing and examining them before surgery?].

Finally, I want to make it clear that I do not want to make this attack on me a "women issue"; it should fail on the weakness of the case and the inadequacies of the AANS process. However, please read the full transcript of the PCC hearing, as well as all materials sent to you, and ask yourself: If Dr. Epstein were a man with her credentials (over 300 publications, Clinical Professor of Neurological Surgery at Stony Brook, and on the editorial boards of Spine (since 1990), Journal Spinal Disorders Techniques, now Clinical Spine Surgery (since 1990), The Spine Journal (since 2001), AND EIC of Surgical Neurology International (which has 20,000 downloads per month and is read in 233 countries), -- would **he** have been treated in the same abusive and disrespectful way? BTW: over the years, I have been better treated by orthopedic organizations, than by my own organization, the AANS. In fact, I was President of the prestigious Cervical

Spine Research Society over 18 years ago. Given my accomplishments, isn't it embarrassing that I was never invited to be part of the AANS leadership.

In any case, I do not want the focus to be about me. The focus should be on improving the care of our patients. My father, Dr. Joseph Epstein, was an internationally renowned neurosurgeon. At age 5, I decided I wanted to be a neurosurgeon just like him,-- from then on he drilled into me that it was all about – “**what is best for the patient**”. – and this has always been my driving motivation.

But again, this is not about me. **In fact, this is now about YOU and it is now about what the AANS stands for.** What is the message **YOU** want to send regarding the purpose of the **AANS Expert Witness Rules and Code of Ethics**? Is it designed to **improve patient care** or to, simply, intimidate neurosurgeons so as to discourage testimony against other neurosurgeons?

One other point, Dr. X don't you think you should recuse yourself. You trained Dr. A and I believe you have or had financial ties to Medtronic, the manufacture of TLIF.

Appendix 2. My September, 2018 letter to the Board for their meeting on November 16, 2018.

To the Board of AANS

From: Nancy Epstein, MD

Date: September 2, 2018

The PCC found that I violated two AANS Expert Opinion Rule, A.3 and A.4.

Re Complaint #2: Violation of AANS Expert Opinion Rule A.3. (The neurosurgical expert witness shall identify as such any personal opinions that vary significantly from generally accepted neurosurgical practice.)

First, I maintained in my testimony, and still maintain, that in my opinion, the MI-TILF was not the right operation for this patient, even though many other surgeons may have done this procedure. I also still maintain that many surgeons would not have performed this operation on this patient. NOTE: Dr. C was going to do a laminectomy, which is the SAME operation I maintain this patient should have had.^[1] [By the way, it is not clear how the PCC is interpreting the phrase “generally accepted neurosurgical practice” in Rule A.3. Is the PCC claiming that there is only one generally accepted neurosurgical practice? Surely there is more than one generally accepted practice the appropriateness of which varies depending upon the condition/situation of each patient.]

Second, if you read the complete trial testimony, which was available to the PCC and is to you as well, I made it clear it was my opinion.^[2] Further, the Judge stated at Trial (Epstein Trial Testimony Pg. 9 Lines 12-14): “Here I find that the doctor is an expert in her field of endeavor so she'll be permitted to give you her opinions on that subject.” In fact, the judge permitted me to testify regarding my opinion based upon the guidelines expressly set forth in the New Jersey Rule of Evidence 702, which mirrors the Federal Rule of Evidence 702. That is, according to the judge, I was qualified by both the New Jersey State and Federal Rules of Evidence to be an expert and to give expert testimony pursuant to the rules which state, and I quote: “If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education may testify thereto in the form of an opinion or otherwise.” N.J.R.E. 702. Thus, by its very language, a witness may qualify as an expert on the basis of only one of the following: knowledge, skill, experience, training or education. And, may express her opinion.

Re Complaint #3: Violation of AANS Expert Opinion Rule A.4. (The neurosurgical expert witness shall recognize and correctly represent the full standard of neurosurgical care and shall with reasonable accuracy state whether a particular action was clearly within, outside of, or close to the margins of the standard of neurosurgical care.)

First, how does “standard of care” (SoC) differ from “generally accepted neurosurgical practice” as used in RULE A.3? In any case, the two points I made above are relevant here as well.

The PCC charged that I “. did not acknowledge that such procedures are generally accepted practice and, therefore, the PCC did not believe that her testimony correctly represented the full standard of neurosurgical care.” First, a complete reading of my trial testimony will indicate that I did acknowledge that there was a range of approaches.^[2]

By the way, I am not sure what the rule means by “correctly represent the full standard of neurosurgical care”. Surely the AANS is not taking the position that there is one SoC for all patients. According to the AANS Expert Witness Rules (Rule for Neurosurgical/Medical/Legal Expert Opinions 2006), this Committee must decide whether my expert opinion was honest, transparent, and supported by documentation, not whether a MI-TLIF was the standard of care

in this case. To do otherwise, the AANS would be going beyond its prescribed responsibility, and, in effect, would be determining the standard of care and imposing it on all our members, -- many of whom maintain valid opinions to the contrary. There is a wider range of generally accepted neurosurgical approaches beyond the one chosen by Dr. A. However, even if MI-TLIFs were indisputably the leading neurosurgical procedure, which it is not, this does not, and should not, mean that other options favored by experienced and caring physicians are thereby invalid-- or that they are not worthy of expression in a legal dispute. I can be accused only of telling the truth about what I have seen, and still see, in my practice of neurosurgery and what is supported currently in the literature.^[3] And again, the judge ruled on the basis of the court's legal standard that I was an expert and could therefore express my opinions.

Further, in general if you suppress intellectually honest opinions such as mine, you are not acting in the best interest of our patients. Only through ongoing, open, and honest discussions about the benefits and risks of surgical procedures can the AANS be of service to the public and the profession.

FOOTNOTES

[1] On 1/25/10, the patient saw Dr. C (with whom she had originally booked surgery; it was cancelled due to the snowstorm). Dr. C stipulated that she needed a decompression alone without a fusion. (Dr. C Deposition 12/22/15: Pg. 19: Lines 18-25: see below).

[2] Examples where Epstein Trial Testimony Acknowledges Range of Approaches

Dr. Epstein's Trial testimony Pg. 80 Lines 9-15

If they felt that they had to do too much nerve root manipulation or retraction, they could have skipped the interbody fusion altogether, and just put in the screws into the vertebral bodies, and put the bone chips off to the side.

Dr. Epstein's Trial testimony pg. 108 lines 4-5

Epstein:...that there are many out there who do TLIFs

Dr. Epstein's Trial testimony pg. 108 Lines 17-18:

Question: And you disagree with their....

Epstein: Yes I do because I think there are safer alternatives.

Dr. Epstein's Trial testimony pg. 108 lines 19-23

Epstein acknowledges that different spine doctors choose to do different operations.

Question: Okay. But you agree that, within the field of medicine, there are not uncommonly disagreements between doctors about what is the best way to proceed with a patient, correct?

Dr. Epstein's Trial testimony pg. 109 Line 3-5

Question; so that I was correct when I asked you that question, right?

Epstein: Yes.

Dr. Epstein's Trial testimony Pg. 109, Lines 6-14

Dr. Epstein: OKAY. And people do things differently. If they are doing the procedures and the complications are over and above what they should be, then those procedures have to be reexamined, and the indications and the reasons for doing them have to be reassessed.

Epstein Trial testimony, Pg. 109 Line 15: Pg. 110 Line 3:

I am testifying that in this case this was not the best operation for this patient, and did not rule out that reputable spine surgeons could choose to perform TLIF.

Epstein Trial testimony pg. 111, I agreed that medical schools and major teaching institutions teach their residents how to do TLIF.

Question, Pg. 111, Lines 8-10: You would agree that, in this country, there are many leading medical schools that teach their residents to do TLIF procedures, correct?

Epstein Line 11: Yes

Epstein Trial testimony Line 16-19

Question: You would agree that in NYC some of the leading orthopedic and neurosurgical centers have surgeons there that do TLIF procedures correct?

Line 15: Epstein: Yes

Epstein Trial testimony Pg. 132 lines 16-15; Pg. 133 Line 1

Question: Okay. But just because somebody like you thinks there's a better way to do a Surgery then either an XLIF or a TLIF doesn't mean that a doctor who believes in doing a TLIF or an XLIF operation is negligent when they do it, correct?

Dr. Epstein: Yes

[3] Articles Documenting Risks of TLIF (from Epstein Response to Grievance 9/24/17)

Chrastil *et al.* Spine 2013: 17 articles about the complications with BMP TLIF/PLIF; these included heterotopic ossification within the epidural space or neuroforamina, postoperative radiculitis, and endplate osteolysis with interbody device subsidence.

Zhang *et al.* Medicine 2016 confirms the comparable efficacy of fusion for PLF vs. TLIF

Bakhsheshian *et al.* J Clin Neurosci 2016 further confirmed 5 MIS TLIF graft/cage extrusions in 513 patients

Joseph *et al.* Neurosurg Focus 2015: 5454 MI TLIF: 1045 complications-rate per patient was 19.2% in the MI-TLIF group ... sensory, temporary neurological deficits, permanent neurological deficits respectively 20.16%, 2.22%, and 1.01% for MI-TLIF ... Rates of intraoperative and wound complications were 3.57% and 1.63% for MI-TLIF

Giorgi *et al.* Orthop Traumatol Surg Res 2015: MI TLIF 182 cases: The rate of postoperative complications was 7.7%.

Liu J, Eur Spine J 2016: In this series, 101 TLIF: 2 cases (1.9 %) root dysfunction, dural tears TLIF 4 cases (3.9 %), re-operation rate TLIF 2 cases (1.9 %), wound infection TLIF 5.0%

Klingler *et al.* Scientific World Journal 2015: more durotomy with MIS TLIF: 372 patients: 32 durotomies (514 levels) (6.2%). Correlated with age over 65 and obesity (Marlowe 66 and obese)

Norton Spine 2015: Degenerative spondylolisthesis: Patients who had TLIF + higher risk of mortality than patients who had PLF

Nixon AT Surgical Neurol Int. 2014 Of 340 TLIF, 4 (1.2%) new lower extremity weakness (with degenerative spondylolisthesis).

Park Y Clin Orthop Surg 2015: Perioperative complications occurred in 9% of TLIF patients (11/124); including three postoperative neuralgia, two deep wound infections, two pedicle screw misplacements, two cage migrations, one dural tear, and one grafted bone extrusion

Hoy K, Eur Spin J 2013: TLif vs. PLF (instrumented): 51 patients had TLIF, 47 PLF). No statistic difference in outcome between groups could be ... Operation time and blood loss in the TLIF group were significantly higher than in the PLF group.

Wang J, Zhou Y, Spine J. 2014 Sep 1;14 (9):2078-84. They noted the reported incidence of perioperative complications associated with MIS-TLIF surgery is highly variable. They found 75 perioperative complications in 204 patients (36.76%); 31.37% (64/204 patients) in the MIS-TLIF operations; seven (9.33%) were classified as persistent and 68 (90.67%) were classified as transient.

Wong AP *et al.*, J Neurosurg Spine. 2015 May; 22 (5):487-95. They analyzed intraoperative and perioperative complications in 513 consecutive MI-TLIF-treated patients with lumbar degenerative disc disease....The perioperative complication rate was 15.6%; durotomy was 5.1%, and the medical and surgical infection rates were 1.4% and 0.2%,

Articles by Dr. Epstein documenting complications from Minimally Invasive Surgery Including MI-TLIF and others

Epstein, NE, Surg Neurol. 2008 Oct; 70 (4):386-8). This study demonstrated 4 complications of MIS MetRx and 2 involving X-Stop Devices (all outside cases; 2 MetrRx cases reoperated on by Dr. Epstein showed dissection was not even near the foraminal/far lateral discs.

Epstein NE, Surg Neurol Int. 2011; 2011;2:188.) (Appendix B) she documented that spine surgery in geriatric patients is sometimes unnecessary, too much, or too little (MIS). In one study, she referred to their observed 10% complication rate for decompression alone (average age 76.4), 40% complication rate for decompression/limited fusion (average age 70.4), and 56%... for full curve fusions (average age 62.5).

Epstein NE, Surg Neurol Int. 2016 Jan 25;7(Suppl 3) she documented more nerve root injuries occur with minimally invasive lumbar surgery... Desai *et al.* large Spine Patient Outcomes Research Trial studies showed the frequency for nerve root injury following an open discectomy ranged from 0.13% to 0.25%, for open laminectomy/stenosis with/without fusion it was 0%, and for open laminectomy/stenosis/degenerative spondylolisthesis with/without fusion it was 2%. Desai A, *et al.*, J Neurosurg Spine. 2011;14:647–53). Alternatively, one study compared the incidence of root injuries utilizing MIS transforaminal lumbar interbody fusion (TLIF) versus posterior lumbar interbody fusion (PLIF) techniques; 7.8% of PLIF versus 2% of TLIF patients sustained root injuries.