# STATE OF MICHIGAN

# COURT OF APPEALS

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LEO TONDREAU as Personal Representative of the Estate of SANDRA PEETZ,

Plaintiff-Appellee,

v

SACHINDER S. HANS, M.D., P.C. and SACHINDER S. HANS, M.D.,

Defendants-Appellants,

and

HENRY FORD MACOMB HOSPITAL, a/k/a HENRY FORD MACOMB HOSPITAL-CLINTON TOWNSHIP CAMPUS, LI ZHANG, M.D., and MACOMB ANESTHESIA, P.C.,

Defendants.

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UNPUBLISHED
March 14, 2013

No. 300026
Macomb Circuit Court
LC No. 2009-002913-NH

Before: WILDER, P.J., and GLEICHER and BOONSTRA, JJ.

PER CURIAM.

Defendants, Dr. Sachinder S. Hans and Sachinder S. Hans, M.D., P.C., appeal by leave granted[1] from the trial court's order allowing certain expert witness testimony. We affirm.

[1] This Court initially denied defendants' application for leave to appeal. *Estate of Peetz v Henry Ford Macomb Hosp*, unpublished order of the Court of Appeals, entered May 26, 2011 (Docket No. 300026). Later, the Supreme Court remanded this case to this Court for consideration as on leave granted. *Tondreau v Henry Ford Macomb Hosp*, 490 Mich 988 (2008).

## I. BASIC FACTS

This medical malpractice case arises from the death of 67-year-old Sandra Peetz following a procedure to remove a blockage in her carotid artery. The procedure, a carotid endarterectomy (CEA), was performed by Dr. Hans at Henry Ford Macomb Hospital. Peetz died after the surgery from a subdural hematoma, which is a collection of blood outside the brain and under the dura, a membrane that covers the brain and spinal cord. The pressure of the hematoma caused the brain to shift and fold into the brain stem.

### A.

As background, the parties do not dispute that there are two methods of performing a CEA. First, under local anesthesia, the doctor enters the neck, clamps off the carotid artery just below the blockage, clears the blockage, unclamps the artery, and closes the incision. While clamped, the flow of blood and oxygen is restricted to the associated hemisphere of the brain. While the supply of blood is reduced to this side of the brain, there is nonetheless enough "indirect" blood supplied from the other side of the body to provide the necessary oxygen. Brain activity is monitored through communications with the patient, who remains conscious, by asking the patient questions or to squeeze an object, etc. This enables the attending physicians to recognize any neurological symptoms immediately.

The second method of performing a CEA involves placing one end of a shunt or tube below the blockage and the other end above the blockage, keeping blood flowing to that side of the brain. Once the blockage is removed, the shunt is removed as well. During this procedure, the patient is fully anesthetized, and brain activity is monitored with an EEG. The parties acknowledge that this method presents additional risks, however.

### B.

Dr. Hans is the vascular surgeon who performed the CEA on Peetz, and the following facts related to Peetz's care are undisputed by the parties. The surgery started at around 7:44 a.m. and lasted most of the morning. Shortly after the surgery commenced, Peetz's blood pressure was 200/98. The left carotid artery was clamped at 8:08 a.m. During this time, Peetz was conscious. At 8:20 a.m., Peetz's blood pressure measured 200/103. Despite blood pressure medication given at 9:05 a.m., Peetz's blood pressure remained elevated.

During the surgery, Dr. Hans determined that the blockage extended higher up and to ensure that Peetz remain perfectly still, he requested that she be fully anesthetized for the remainder of the surgery. Peetz was in the recovery room by 11:00 a.m. At 12:15 p.m., Dr. Hans saw Peetz and noted certain neurological defects that were consistent with a stroke. He suspected a clot or dissection in the carotid artery and ordered exploratory surgery. During this second surgery, Dr. Hans found no clotting, lesion, or embolism, but to be safe, he inserted a stent. Peetz was returned to the recovery room by 3:45 p.m. Not seeing any improvement, Dr. Hans ordered a CT scan at 4:57 p.m. At 6:30 p.m., the CT scan was performed. The scan revealed the presence of a subdural hematoma – a high-density chronic bleed outside the brain in the space between the brain and the dura—as well as a bleed in the subacrachnoid space, which is located between two of the tissue layers covering the brain. As the subdural hematoma

expanded, it compressed the brain and ultimately caused the brain to shift until it herniated into the brain stem, causing brain death. Life support was withdrawn the following morning.

C.

It is plaintiff's causation theory that Peetz's subdural brain bleed began shortly after Dr. Hans clamped Peetz's left carotid artery. Because the clamp dramatically decreased blood flow to the left cerebral hemisphere, the volume of Peetz's left brain contracted slightly. Small "bridging" veins in the subdural space tore as the brain sagged away from the skull. The bleeding from these veins accelerated when Dr. Hans re-established flow through the left carotid at an elevated pressure and concomitantly administered heparin, an anticoagulant drug.

Two expert witnesses testified to this theory of causation: Dr. Wayne Flye, a vascular surgeon, and Dr. Donald Austin, a neurosurgeon. Dr. Flye also testified regarding Dr. Hans' breaches of the standard of care. According to Dr. Flye, Dr. Hans violated the standard of care by failing to (1) use a shunt during the period that Peetz was unconscious during the first surgery, (2) immediately obtain a CT scan upon finding no explanation for Peetz's neurological symptoms following the second surgery, and (3) control Peetz's blood pressure after unclamping her carotid artery. Dr. Flye further opined that Dr. Hans's failure to get a CT scan after the first surgery also fell below the standard of care.

During Dr. Flye's deposition, he explained his theory of what actually caused the bleeding that ultimately led to Peetz's death. Dr. Flye stated that during the initial surgery, because of the clamping on the left carotid artery, Peetz's brain on the "left hemisphere is a little less engorged, a little less turgid than the right hemisphere because it's getting less blood flow at a lesser head of pressure." He explained that during this time the left hemisphere was not as turgid, the hemisphere decreases in volume "just a little," which resulted in it pulling and sheering "bridging veins" that cross the dural space:

> *Q.* So it's your position that for a two-hour period of time the left hemisphere is being inadequately fed, for want of a better expression?
>
> *A.* Yes. We know in the first hour the neurons are getting enough blood and oxygen to function in a gross fashion, and then the second hour we don't know [because Peetz was unconscious this second hour and unable to provide any feedback during the procedure, unlike the first hour].
>
> *Q.* Okay. Okay. Now, how did that cause her to have the bleed?
>
> *A.* I think during the time that the brain was not as turgid, it was sort of sagging away from the skull. Later when it begins to swell, it's swelling again, it's now – when the blood pressure is not as high in the brain, it sort of decreases in volume just a little and it's pulling against these bridging veins that cross the dural space, subdural space.
>
> *Q.* And that caused the bleed?
>
> *A.* Yes, that initiated the bleed.

* * *

*Q.* [So, as] a result of the presence of inadequate perfusion or as a result of the lack of adequate perfusion, the brain decreases in volume for the simple reason that the blood that would normally keep it at that same – bulked up, is not there?

*A.* Correct.

*Q.* In sufficient amount and so it shrinks, and in shrinking, it tears away the venous structure that's attached to the skull?

*A.* To the dura, that's right.

*Q.* To the dura?

*A.* Right. The only question I would have is use of adequate. I think we're on the same page, but that's open to perception, so –

*Q.* Okay. I used the term adequate. The perfusion was not adequate. Is that a bad term?

*A.* How about normal, wasn't normal compared to the other side. Wasn't equivalent to the right side.

Dr. Austin testified similarly. He opined that the hypoperfusion caused Peetz's brain to retract from the inner surface of the dura, which caused the bridging veins from the brain to the superior sagittal sinus to be torn, resulting in bleeding.

Defendants moved at the trial court to preclude admission of Dr. Flye's and Dr Austin's testimony regarding this particular theory of what specifically caused the subdural hematoma. Defendants argued that this theory of the brain pulling away from the skull and tearing veins is not supported by scientific proof, practical experience, case studies, or literature.

The trial court denied defendants' motion:

> [B]oth experts have relied on their vast experience, training, education and general neurosurgical knowledge in formulating their opinions. The attached CV's along with their cogent and clear testimony demonstrate their substantial understanding of the neurosurgical setting. Because both experts indicated that this situation is a rare one, it is not inconceivable that neither had personally encountered it, and it does not translate into a phenomenon that did not, or could not have occurred. In this regard, the Court finds that the experts' testimony establishes that the elements of MRE 702 and MCL 600.2955 have been satisfied, such that they will not be disqualified. "The inquiry is not into whether an expert's opinion is necessarily correct or universally accepted. The inquiry is into whether the opinion is rationally derived from a sound foundation." *Chapin* [*v A & L Parts, Inc*, 274 Mich App 122, 139; 732 NW2d 578 (2007)]. Here, the

> testimony has convinced the Court that both experts expressed rational bases for their conclusions, and this testimony will clearly enable fact finders to have a better understanding of the procedures, or failure of procedures, which may have led to this patient's death.

## II. ANALYSIS

Defendants argue that the trial court erred when it determined that plaintiff's expert witnesses could testify regarding the cause of Peetz's subdural hematoma. We disagree.

We review a trial court's exercise of its role as a gatekeeper under MRE 702 for an abuse of discretion. *Clerc v Chippewa Co War Mem Hosp*, 267 Mich App 597, 601; 705 NW2d 703 (2005). A trial court abuses its discretion when its decision falls outside the range of reasonable and principled outcomes. *Maldonado v Ford Motor Co*, 476 Mich 372, 388; 719 NW2d 809 (2006).

MRE 702 governs the admissibility of expert testimony:

> If the court determines that 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 if (1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Our Supreme Court has stated that this rule of evidence "incorporates the standards of reliability that the United States Supreme Court described to interpret the equivalent federal rule of evidence in *Daubert v Merrell Dow Pharm, Inc*, 509 US 579; 113 S Ct 2786; 125 L Ed 2d 469 (1993)." *Edry v Anderson*, 486 Mich 634, 639; 786 NW2d 567 (2010). Further, MRE 702 "impose[s] an obligation on the trial court to ensure that any expert testimony admitted at trial is reliable." *Gilbert v DaimlerChrysler Corp*, 470 Mich 749, 780; 685 NW2d 391 (2004). "Careful vetting of all aspects of expert testimony is especially important when an expert provides testimony about causation." *Id.* at 782. The *Gilbert* Court explained that the rules of evidence do not allow the admission of expert opinion evidence that "'is connected to existing data only by the *ipse dixit* of the expert,'" and that testimony is inadmissible when "'there is simply too great an analytical gap between the data and the opinion proffered.'" *Id.* at 783, quoting *Gen Elec Co v Joiner*, 522 US 136, 146; 118 S Ct 512; 139 L Ed 2d 508 (1997). In other words, as the trial court noted, "The inquiry is not into whether an expert's opinion is necessarily correct or universally accepted. The inquiry is into whether the opinion is rationally derived from a sound foundation." *Chapin*, 274 Mich App at 139; see also *Anton v State Farm Mut Auto Ins Co*, 238 Mich App 673, 678-679; 607 NW2d 123 (1999) (stating that a trial court is not concerned with the ultimate conclusion of an expert, only the method, process, or basis for the expert's conclusion). Hence, "junk science" must not be admitted into evidence. *Gilbert*, 470 Mich at 782.

We conclude that the causation theory offered by plaintiffs' expert witnesses "is rationally derived from a sound foundation," and thus the trial court did not abuse its discretion when it denied defendants' motion to preclude the experts' testimony. Here, the crux of the objected-to expert opinions is that the subdural hematoma was caused by a variety of factors which included: (1) in this case, the lack of blood flow in the left hemisphere of the brain caused it to shrink, retract, or sag a bit from the skull, (2) this retraction from the skull pulled at the bridging veins, which caused them to tear, and (3) bleeding from these resulting tears, accelerated by the administration of an anticoagulant drug, then caused the bleeding into the subdural cavity.

First, the literature submitted by the parties shows that it is well known in the scientific community that torn or sheered bridging veins can cause bleeding into the subdural cavity. See, e.g., Ellis, *Subdural Hematoma in the Elderly*, 8 Emergency Medicine Clinics of North America 281 (May 1990). The literature also established that the elderly are particularly susceptible to this phenomenon because as people get older, their brains naturally shrink, which enlarges the amount of subdural space the bridging veins have to span. Since the veins have to now traverse a larger space, they are more susceptible to tearing. Again, defendants do not disagree with or dispute these scientific facts. Thus, the singular issue before us is whether the opinion testimony (providing that a hypoperfused brain hemisphere of an elderly person can cause such a retraction or shrinking of the brain that it results in bridging veins being torn) is rationally derived from a sound foundation.

Even if, as plaintiff's experts recognized, there are no studies or literature that directly state that this event can happen as a result of a CEA procedure, the absence of a specific study does not render the experts' opinions as lacking in reliability. *Edry*, 486 Mich at 640-641. Dr. Frye explained that, based on his experience operating on other organs, he was able to surmise what happened to Peetz's brain during its period of hypoperfusion:

> In terms of swelling or engorgement or disengorgement of an organ, I've operated a lot on the liver, and the hepatic artery supplies the blood supply to the liver, to the right lobe and a left lobe. If you interrupt one, that part of the liver becomes softer because it's not getting arterial blood supply as opposed to the one continuing to get antegrade blood supply. The analogy is similar to the brain where you have the right and left carotid artery, and when you decrease the pressure in one hemisphere, I would expect that to behave much in the same fashion as the liver lobe. Now, they're not the same organ, but you ask about vascular circumstances and that is a very well observed and described phenomenon. When you decrease the perfusion, an organ gets less tense, a portion of it, when you decrease perfusion of the arterial branch to that portion.

Because Dr. Frye's analogy is reasonable and well-grounded in the medical literature we discern no "analytical gap" separating his opinion from established scientific data. The facts here are distinguishable from the facts in *Edry*, where the Supreme Court held that the expert's testimony was unreliable and inadmissible under MRE 702. In *Edry*, the plaintiff's oncology expert testified that if plaintiff had been initially diagnosed with cancer in 2003, as the plaintiff claimed should have happened, her chance of surviving five years would have been 95 percent. *Edry*, 486 Mich at 637. That expert also acknowledged that the American Joint Cancer

Commission manual was "authoritative" on the subject and that the manual reported a 60-percent five-year survival rate. *Id.* While relying on other textbooks and journal articles, the expert nevertheless stated that the manual was not applicable to the plaintiff's case. *Id.* The Supreme Court, however, noted that the "plaintiff never produced those authorities to support [the expert's] testimony." *Id.* In finding that the expert's testimony was unreliable, the Supreme Court further noted that his opinion was *contradicted* by the published literature that was admitted into evidence, which the expert even acknowledged as authoritative. *Id.* at 640. In short, the "[p]laintiff failed to provide *any* support for [the expert's] opinion that would demonstrate that it has *some* basis in fact." *Id.* at 641 (emphasis added).

Here, unlike in *Edry*, there is an evidentiary basis in fact to support plaintiff's experts' testimony. Plaintiff provided literature establishing that a change in the volume of the brain can cause a tearing of bridging veins. The fact that none of these occurrences was reported as a result of a CEA procedure does not diminish the salient point – that a change in brain volume can cause bridging veins to tear. Regarding what caused Peetz's brain to reduce in volume, Dr. Frye explained that it is well-known that soft organs, such as livers, get less tense or less turgid, i.e., more relaxed, when they are under-perfused. Thus, Dr. Frye's hypothesis that what occurred in the liver was also likely to occur in the brain is based in scientific fact and not mere speculation. Notably, unlike in *Edry*, no presented literature contradicted the assertion that brains or soft organs reduce in volume while they are under-perfused. Thus, we conclude that the trial court did not abuse its discretion when it determined that plaintiff's experts' testimony was based on sound scientific principles, and consequently, the testimony should not be precluded. See *Chapin*, 274 Mich App at 139. As with all factual issues, ultimately, the jury or fact-finder is free to accept or reject this theory.

Affirmed. Plaintiff, as the prevailing party max tax costs pursuant to MCR 7.219.

/s/ Kurtis T. Wilder
/s/ Elizabeth L. Gleicher
/s/ Mark T. Boonstra