UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

ANNABELLE WRIGHT, an individual, Plaintiff, v. UNITED STATES OF AMERICA, Defendant.	Case No.: 3:14-cv-00822-GPC-BLM **MEMORANDUM DECISION FOLLOWING TRIAL AND ORDER FOR ENTRY OF JUDGMENT**

Plaintiff Annabelle Wright ("Plaintiff" or "Ms. Wright") brings this medical malpractice action against Defendant United States of America ("Defendant") under the Federal Tort Claims Act ("FTCA"). (Dkt. No. 1, Compl.) Plaintiff's action arises from heart surgery that healthcare providers at the Naval Medical Center San Diego ("NMCSD") performed on her husband, Wilbur Wright III ("Decedent" or "Mr. Wright") on September 20, 2012. (*Id.*) Plaintiff alleges that NMCSD healthcare providers negligently caused Mr. Wright's death on September 21, 2012. (*Id.*)

On September 30, 2016, the Court conducted a motion *in limine* hearing. (Dkt. No. 78.) On October 3, 4, 5, 6, 11, and 12, 2016, the Court held a bench trial. (Dkt. Nos. 79, 80, 81, 82, 83, 84.) Steven Poliakoff, Esq. and Daniel Butcher, Esq. appeared on behalf of Defendant United States of America, and Suzanne Mindlin, Esq., Beth Golub, Esq., and Robert Weisenburger, Esq. appeared on behalf of Plaintiff Annabelle Wright.

(*Id.*) Having carefully reviewed the evidence and the arguments of the parties, as presented at trial and in their written submissions, the Court makes the following findings of fact and conclusions of law pursuant to Rule 52 of the Federal Rules of Civil Procedure. As discussed below, the Court finds that the healthcare providers at NMCSD acted with the appropriate standard of care and concludes that Defendant is not liable for medical malpractice.

FINDINGS OF FACT

Decedent Wilbur Wright III was born on December 15, 1969. Mr. Wright served in the United States Navy from June 19, 1989 to June 30, 2009, when he was honorably discharged. From June 30, 2009 to early December 2010, Mr. Wright did not work. From approximately early December of 2010, until approximately mid-July of 2012, Mr. Wright worked as a supply utility man in the Military Sealift Command. Mr. Wright died at age 42 and had a life expectancy of 62.79 years per stipulation of the parties. Mr. Wright and Plaintiff were married for ten years.

In May 2012, Mr. Wright was diagnosed with a 5.0 cm aneurysm of his ascending aorta, which is a circumscribed dilation of the large blood vessel that first takes oxygenated blood from the heart to the rest of the body, as well as an abnormal aortic valve. A 5.0 cm ascending aortic aneurysm carries an approximately 10–12% per year risk of a rupture or dissection. Instead of having the usual three cusps in his aortic valve, Mr. Wright only had two. A bicuspid valve like Mr. Wright's can cause blood flow turbulence, which may increase the size of the aneurysm.

Mr. Wright's heart was twice the normal size for an individual of Mr. Wright's size, and his left ventricle was hypertrophied, meaning that the muscle was enlarged and thickened to the point that blood vessels did not extend all the way into the heart muscle. These abnormalities meant that the vessels might not effectively carry cold cardioplegic solutions, which protect heart tissues during surgery, into the inferior wall of Mr. Wright's heart. In addition, Mr. Wright's heart had a left-dominant coronary system, meaning that the left main coronary artery, which branches off into the left anterior

descending artery and the circumflex artery, supplied about four-fifths of his heart. In turn, Mr. Wright's circumflex artery supplied both the inferior (primarily via the posterior descending artery) and lateral (via an obtuse marginal branch) walls of Mr. Wright's heart. Any kinking of the left circumflex artery would have affected both the inferior and lateral walls of Mr. Wright's heart.

CDR Theodore Pratt, M.D., a board-certified cardiothoracic surgeon and then-Chief of Cardiothoracic Surgery at NMCSD, evaluated Mr. Wright in 2012 and recommended that Mr. Wright undergo a modified Bentall procedure to remove and replace both his aortic heart valve and the diseased portion of his aorta. A modified Bentall procedure is one of the most complex heart surgeries and carries an approximately 5% risk of dying. During his pre-operative evaluations, Dr. Pratt informed Mr. Wright of the risks of this surgery, and Mr. Wright signed a consent form acknowledging that these risks included, *inter alia*, bleeding, heart attack, and death.

During a modified Bentall surgery, the diseased portion of the aorta and the abnormal valve are removed and replaced with a mechanical heart valve connected to a tube of woven Dacron, a synthetic fabric. The combined valve and tube of woven Dacron are referred to collectively as a valve conduit or, more simply, a conduit. In order to remove the portion of the aorta with the aneurysm, the surgeon detaches the left and right coronary arteries, which supply blood to the heart, from the aorta within a circular "button" of adjacent aortic tissue. At the center of each button is the coronary artery ostium, the opening of the artery itself. Each coronary artery ostium is surrounded by aortic tissue from the sinus of Valsalva. The left and right coronary artery buttons are then reattached, or anastomosed, to the conduit after the conduit has been attached to the heart.

A patient is placed on a heart-lung machine, or cardio-pulmonary bypass ("CPB" or "bypass"), during a modified Bentall procedure. Bypass is necessary to circulate oxygenated blood to the brain and rest of the body while the surgeons remove the diseased heart valve and aorta, replace them with the conduit, and then reattach the

coronary arteries. Once a patient is placed on bypass, the surgeon arrests the heart, or stops it from beating, by administering cardioplegia, a cold solution containing high levels of potassium, and by placing a clamp across the aorta. CPB lowers the temperature of blood. Components of the blood, such as platelets and clotting factors in the blood plasma, are damaged during bypass. Extended time on CPB can result in a medical coagulopathy, or a medical bleeding disorder, wherein the blood loses the ability to clot properly. Coagulopathy is treated by administering transfusions of blood and blood products, such as platelets and cryoprecipitate.

On September 20, 2012, Mr. Wright underwent a modified Bentall procedure. Mr. Wright's September 20, 2012 surgery was performed by Dr. Pratt, who was assisted by CDR Alfredo Ramirez, M.D., a board-certified cardiothoracic surgeon who is now the Chief of Cardiothoracic Surgery at NMCSD. Since 2003, Dr. Pratt performed approximately thirty Bentall procedures as the primary surgeon and was the assistant surgeon in approximately thirty Bentall procedures. Prior to September 20, 2012, Dr. Ramirez personally performed an estimated five to seven Bentall procedures as the primary surgeon and was the assistant surgeon in approximately seventy to eighty Bentall procedures.

The operation began at approximately 8:39 a.m. Mr. Wright was given a powerful blood-thinning agent, Heparin, and was placed on CPB beginning at approximately 9:15 a.m. Mr. Wright's heart was arrested, and Mr. Wright's blood was run through plastic tubing and a cardio-pulmonary bypass machine to oxygenate the blood before returning the blood to Mr. Wright's body.

Dr. Pratt removed the aneurysmal portion of Mr. Wright's aorta and the bicuspid aortic valve, and created the right and left coronary artery buttons. The operative report states that Mr. Wright's left "coronary button was noted to be large and the tissue thinned from the patient's enlarged sinus." (Jt. Ex. 4-003.) When creating the right and left coronary artery buttons, Dr. Pratt and Dr. Ramirez assessed the integrity of Mr. Wright's aortic tissue by how it appeared, how it felt when the tissue was being cut and the

coronary artery buttons were created, how the tissue handled when picked up with surgical forceps, and how the tissue held sutures when the stitches were done. Dr. Ramirez testified that the tissue consistency for the left and right coronary artery buttons was similar, and that while the tissue used for the buttons "was thinner than normal," it was "by no means . . . thinner than anything else [he] had seen before," and he "didn't feel . . . that it was not a suitable cuff to be able to use as a coronary button." (Tr. 1031:09–16.)

Dr. Pratt then performed four anastomoses in the following order: the proximal suture line, the left coronary artery button, the distal suture line, and right coronary artery button. Dr. Pratt attached the conduit to Mr. Wright's heart at the proximal suture line using interrupted horizontal mattress sutures with small pledgets of Teflon felt "all the way along the aortic annulus." (Jt. Ex. 4-003.) A thin layer of BioGlue was placed along the suture line. (*Id.*)

Dr. Pratt then anastomosed the left coronary button to the conduit using a single layer of sutures. To avoid twisting or kinking the arteries when he anastomosed the buttons to the conduit, Dr. Pratt placed orienting sutures on the buttons so that "twelve o'clock" on the buttons corresponded to "twelve o'clock" on the conduit.

Dr. Pratt then performed the distal suture line anastomosis, using two layers of Teflon felt pledgets for reinforcement and running continuous sutures to connect the conduit to the aorta. A thin layer of BioGlue was placed along the suture line. Finally, Dr. Pratt performed the right coronary artery button anastomosis in the same manner as the left coronary artery button anastomosis, using a single layer of sutures. All of Mr. Wright's anastomoses, whether they were to the heart, the remaining aorta, or between the coronary artery buttons and conduit, were pressure-tested twice to ensure, as best as possible before the bypass was discontinued, that they would not leak.

After the procedure was completed, a period of time was allowed for the heart to recover from being kept cold and not beating, and Mr. Wright's heart was gradually weaned from bypass. The surgery, up until attempted weaning, proceeded uneventfully.

In attempting to wean Mr. Wright from CPB at approximately 12:04 p.m., Dr. Pratt observed bleeding coming from the area behind the conduit in the region of the left coronary artery button. Dr. Pratt attempted to identify the precise source of the bleeding, but was unsuccessful. The precise source of the bleeding could not be identified without placing undue traction on the aorta and the newly created anastomoses between the conduit graft, the aorta, and the coronary artery buttons. In order to identify the specific site of bleeding, it was necessary to place Mr. Wright back on bypass, reapply the cross clamp, and re-arrest the heart, so that the conduit could be opened and the anastomoses inspected directly.

Accordingly, Mr. Wright was placed back on CPB. Dr. Pratt cross-clamped the aorta, arrested the heart, opened the conduit transversely, and inspected the left coronary artery button anastomosis.[1] The left coronary artery button suture line was checked for tension, and Dr. Pratt placed additional sutures where needed to adjust the tension of the suture line.[2] Dr. Pratt examined the outside of the graft as well while he made these repairs. Dr. Pratt then closed the conduit with sutures and removed the aortic cross-clamp.

---

[1] Dr. Pratt testified, "I saw potential areas of bleeding and I knew I had narrowed it down to a fairly small portion on the clock, and I put sutures into where I thought the most likely spots of bleeding could be." (Tr. 778:20–23.) Instead of redoing the entire anastomosis, he evaluated the anastomosis and ruled out 75 to 80% of the anastomosis as the problem area. He determined that a "small portion" needed to be addressed, and so gave that small portion a "small suture." (Tr. 781:14–19.)

[2] Dr. Ramirez testified, "I think when we opened the graft, if I remember correctly, I think he used a Teflon reinforcement stitch," which was a single stitch, reinforced by a Teflon pledget. (Tr. 1047:01–10.) After having his recollection refreshed with the operative note, Dr. Ramirez again testified, "It's my recollection that he used an interrupted Teflon pledgeted stitch" in the inside of the graft. (Tr. 1049:05–08.) The Court does not credit Dr. Ramirez's recollection on this point. Neither the operative note nor Dr. Pratt's testimony indicates that Dr. Pratt in fact used a Teflon pledget for reinforcement during his first attempt to repair the left coronary artery button. The left coronary artery ostium was noted to be unremarkable in Dr. Luzi's autopsy report, and Dr. Swalwell and Dr. Jamieson testified that there was no occlusion or narrowing at the left coronary artery button or within the lumen, or the inside space, of the artery. (Tr. 899:25–900:12, 1138:01–08.)

Another attempt at weaning from bypass was undertaken. In this second attempt to wean Mr. Wright from CPB, Dr. Pratt observed bleeding from the inferior edge of the left coronary artery button, where it appeared that the tissue of the coronary button had begun to tear along the suture line. (Jt. Ex. 4-004.) Dr. Pratt then placed a single stitch over a pledget of pericardium to stop the bleeding. (*Id.*) After Dr. Pratt made this repair, no further bleeding was observed from the left coronary artery button. Mr. Wright was taken off CPB at 3:05 p.m, and the blood-thinning agent Heparin was reversed. Following separation from bypass, Mr. Wright's heart was noted to have a stable rhythm, and his vital signs, including pulmonary artery pressures, were noted to be stable.

Dr. Pratt and Dr. Ramirez testified that at no point during the surgery did they observe or detect bleeding from the proximal suture line. Because bleeding in the proximal suture line area is difficult to visually detect, Dr. Pratt tested for bleeding by using white gauze pads and a white hemostatic powder, so that any bleeding would stain the white gauze or powder. The left coronary artery button was the only site of bleeding Dr. Pratt and Dr. Ramirez observed, and no bleeding was observed from the left coronary artery button after Dr. Pratt's second repair.

Mr. Wright had been on bypass from 9:15 a.m. until 3:05 p.m. (Jt. Ex. 2:004, 2:010.) While modified Bentall procedures normally take between four and a half to six hours, Mr. Wright's case was prolonged by the bleeding that was encountered and the procedures that were necessary to stop the bleeding. Dr. Stuart W. Jamieson, Defendant's designated expert in cardiothoracic surgery, testified that "[b]leeding is a major risk in heart surgery" that "[e]very experienced surgeon" has encountered in a Bentall procedure, and the fact that bleeding occurs does not indicate that there was a breach in the standard of care. (Tr. 1089:17–1090:01.)

After Mr. Wright was taken off CPB at around 3:05 p.m., a transesophogeal echocardiography ("TEE" or "echo") probe was placed, and a scan of Mr. Wright's heart was performed. The TEE scan noted that a portion of the inferior wall of Mr. Wright's heart appeared to be hypokinetic, or have decreased contractility. Decreased contractility

after cardiac surgery can have many causes, such as the patient being on bypass, the length of time on bypass, the length of time that the aorta is cross-clamped, the heart being cold, and air remaining in the heart's circulation. Hypokinesis may also take any time between minutes to hours to resolve. Mr. Wright's heart was accordingly given time to recover. During this recovery period, the surgeons and anesthesiologists adjusted Mr. Wright's medications and inserted an intra-aortic balloon pump ("IABP") at 3:41 p.m. to offload some of the strain off of the left ventricle, mechanically reduce cardiac work, and increase cardiac perfusion pressures. (Jt. Ex. 2:013; Jt. Ex. 4:004.)

Mr. Wright's heart function was observed for a period of time. Mr. Wright's cardiac outputs—the stroke volume, or the amount of blood being pumped out of the heart in liters per minute—improved during this observation period. From 3:53 p.m. to 4:08 p.m., Mr. Wright's cardiac output was 4.2; from 4:53 p.m. to 5:08 p.m., it was 4.5;[3] and from 5:38 p.m. to 5:53 p.m., it was 5.3, a cardiac output which Dr. Robert L. Shuman, Plaintiff's designated expert in cardiothoracic surgery, agreed was within normal limits for a man Mr. Wright's age, and which Dr. Jamieson characterized as "high." (Jt. Ex. 2:014, 2:017; Tr. 342:13–16, 1132:17–18.) Dr. Jamieson testified that even while the heart is assisted by an IABP, medications, blood, blood products, and fluids, the cardiac output is ultimately generated by the heart: "You cannot improve cardiac output or heart function merely on the basis of fluids and drugs." (Tr. 1133:07–16.) Accordingly, Mr. Wright's improving cardiac outputs reflected actual improvement in his cardiac function. (*Id.*)

---

[3] At approximately 4:50 p.m., the ejection fraction of Mr. Wright's left ventricle was noted to be 30%, compared to 55% before bypass. (Jt. Ex. 3:001.) Cardiac anesthesiologist Dr. Christopher Cornelissen testified that a reduced ejection fraction may take hours to resolve, and that while the echo report showed that "there were still some myocardial segments that were hypokinetic," the hypokinetic areas were "improving." (Tr. 864:02–08.) Dr. Cornelissen also testified that "[i]t's very hard to put a specific number to the ejection fraction. Typically cardiac anesthesiologists will use a generalized kind of estimate of cardiac output" that "is based on the squeeze and the contractility that [they] are visualizing." (Tr. 864:12–21.)

Dr. Ramirez and Dr. Pratt also observed that the strength and contractility of Mr. Wright's left ventricle continued to improve over time. Mr. Wright's pulmonary artery pressures were stable, signifying improvement. Mr. Wright's electrocardiogram ("EKG") showed no evidence of ST segment changes, meaning that the EKG readings did not reflect ischemia or a lack of oxygen to a section of the heart, and did not indicate a myocardial infarction. Given the improvement in contractility and ventricular function, Dr. Pratt did not believe that Mr. Wright needed to undergo the stresses of another major cardiac surgery, such as a coronary artery bypass grafting ("CABG") procedure, which would necessitate further anticoagulation and time on bypass. Dr. Pratt therefore continued to watch Mr. Wright in the operating room.

Beginning at approximately 6:00 p.m., Mr. Wright began to require increased dosages of medication, such as norepinephrine, which was first administered at about 6:06 p.m., to support his blood pressure. (Jt. Ex. 2:016.) Mr. Wright's blood pressure dropped significantly;[4] his need for pressor medications and inotropic support increased; and the decreased contractility in his inferior left ventricle possibly persisted. (Jt. Ex. 4:004.) Dr. Pratt hypothesized in the operative report that these changes in Mr. Wright's condition may have possibly resulted from the stitch that was placed at the left coronary artery button to stop the bleeding at that site. (*Id.*) Regardless of the specific cause, Dr. Pratt and Dr. Ramirez determined that Mr. Wright needed to undergo a CABG procedure to augment the blood supply to his inferior left ventricle.[5]

---

[4] Dr. Pratt tried to close Mr. Wright's chest at around 4:23 p.m., but re-opened it shortly thereafter at about 4:28 p.m., because of the decrease in Mr. Wright's blood pressure. While Mr. Wright's blood pressure decreased briefly between 4:23 p.m. and 4:38 p.m., (Jt. Ex. 2:013), it subsequently rose again and remained relatively stable on average until it decreased significantly between 5:53 p.m. and 6:08 p.m., (Jt. Ex. 2:016).

[5] Dr. Cornelissen formally assumed care of Mr. Wright and relieved the prior cardiac anesthesiologist, a civilian provider, at 7:46 p.m. He estimated that he was contacted between 4:00 and 5:00 p.m. and generally apprised of the fact that he might be needed, and that a turnover would probably be warranted, since the case might go on for longer. (Tr. 860:21–862:08.) He arrived in the operating room at approximately 5:45 p.m. to ensure that he could spend ample time with the previous anesthesiologist to learn the requisite information to take over Mr. Wright's case. During this turnover period, "there was

In order for Dr. Pratt to perform a CABG procedure, the blood-thinning agent Heparin was administered to Mr. Wright at approximately 6:30 p.m., (Jt. Ex. 2:016), and bypass was initiated at 6:46 p.m., (Jt. Ex. 7:004).[6] Dr. Pratt performed Mr. Wright's CABG procedure by harvesting a vein from Mr. Wright's leg and performing two coronary artery bypass grafts. Dr. Christopher Cornelissen, the attending cardiac anesthesiologist, testified that the procedure proceeded "expeditiously." (Tr. 868:01–05.) Following the CABG procedure, Mr. Wright was removed from CPB at approximately 9:05 p.m. The hypokinesis in Mr. Wright's left ventricular inferior wall decreased, and the contractility of Mr. Wright's heart appeared to improve between 9:05 p.m. and 10:48 p.m., based on readings from the TEE probe.

Mr. Wright was observed in the operating room between 9:05 p.m. and 11:13 p.m. During this period of time, Dr. Pratt and Dr. Ramirez observed Mr. Wright's open chest and did not observe, visually or through repeated testing with white gauze and hemostatic powder, evidence of surgical bleeding at the anastomoses. Mr. Wright was clinically stable and transported from the operating room at 11:13 p.m. to the ICU. Dr. Pratt accompanied Mr. Wright to the ICU and remained with him throughout the night.

Mr. Wright arrived in the intensive care unit at approximately 11:20 p.m. on September 20, 2012. After three runs on bypass and the modified Bentall and CABG procedures, Mr. Wright's cardiac outputs were low, and he required a significant amount of inotropic and vasopressor medications to maintain his blood pressure. Mr. Wright exhibited elements of cardiogenic shock, or heart pump failure, and medical coagulopathy. Cardiogenic shock causes leakage of fluid from the blood vessels into tissue spaces. Dr. Kenneth Serio, Defendant's expert in critical care medicine and

---

discussion that [Mr. Wright] may need some additional time to go into cardiopulmonary bypass to potentially take care of the coronary artery bypass grafting." (Tr. 860:17–20.) While there was discussion of the possibility of a CABG procedure during the turnover period, it was not yet determined that a CABG procedure would in fact be necessary when Dr. Cornelissen was contacted.

[6] Jt. Ex. 2:016 notes that bypass was on at 6:50 p.m., whereas Jt. Ex. 7:004 notes that bypass was initiated at 6:46 p.m.

pulmonary medicine, noted that Mr. Wright "had dysfunction of multiple elements of the clotting system," including platelet dysfunction, fibrinogen deficiency, and lack of fibrinolysis. (Tr. 926:21–25, 929:17–24.) In accordance with the appropriate treatments for shock and medical coagulopathy, Mr. Wright received aggressive inotropic and vasopressor support, and he received blood, blood products, and platelets. Dr. Serio testified that the "significant amount of blood product replacement, to the point that [Mr. Wright] had his entire blood volume replaced once with that regimen," was an appropriately aggressive treatment measure, given the level of clotting system dysfunction involved. (Tr. 931:08–15.)

At approximately 12:27 a.m. on September 21, 2012, the morning following surgery, Dr. Pratt removed Mr. Wright's dressing in the ICU because Mr. Wright's blood pressure abruptly decreased. After removal of the dressing, Mr. Wright's blood pressure increased and stabilized. Dr. Pratt observed bleeding from all tissue surfaces as a result of Mr. Wright's medical coagulopathy, and continued to treat Mr. Wright with transfusions of blood, fresh frozen plasma and platelets, and by keeping Mr. Wright in a warm room.

Shortly before 2:00 a.m., Mr. Wright's vital signs deteriorated, and his cardiac rhythm changed to ventricular fibrillation. A cardiac arrest code was called. Dr. Pratt attempted to resuscitate Mr. Wright for over an hour. At 3:08 a.m. on September 21, 2012, Mr. Wright was pronounced dead.

An autopsy was performed on Mr. Wright's body. The Chief of Pathology, CAPT Scott Luzi, M.D., examined Mr. Wright's heart and found a myocardial infarction, or heart attack, in the posterior wall of the left ventricle. Dr. Luzi testified that Mr. Wright's heart weighed 750 grams, among the largest he had seen. Dr. Luzi initially believed there was a "defect" in the back of the graft conduit as it anastomosed to the heart.

On November 17, 2014, Plaintiff's designated experts in cardiothoracic surgery and pathology (Robert L. Shuman, M.D. and John C. Hiserodt, M.D., respectively) and Defendant's experts in cardiothoracic surgery and pathology (Stuart W. Jamieson, M.D.

and Christopher L. Swalwell, M.D., respectively) inspected Mr. Wright's heart. The examination was video-recorded. Mr. Wright's heart was examined for anastomotic defects, as well as the "defect" initially identified by Dr. Luzi. Dr. Hiserodt, Dr. Swalwell, and Dr. Jamieson all concluded that there were no defects in any of the anastomoses, and that the "defect" identified by Dr. Luzi was not present. Dr. Shuman also testified that Dr. Luzi "was incorrect," and that the "defect" was in fact "just a piece of redundant aortic tissue that hadn't been cut away." (Tr. 318:21–319:01.)

The video-recorded examination from November 17, 2014 was reviewed by Dr. Luzi prior to his deposition on December 12, 2014. Dr. Luzi testified that being unfamiliar with the conduit used in the procedure, he had mistakenly identified as a "defect" the area between the conduit and the native aortic tissue that remained after the aneurysm was removed. After reviewing the recorded examination and listening to both parties' pathologists and cardiothoracic experts discuss the anatomy of Mr. Wright's heart and the procedure performed, Dr. Luzi realized that his probe had merely passed easily into a "blind space" between the graft and Mr. Wright's native tissue that remained following removal of the aneurysm, and that no actual defect was present. (Tr. 580:13–23, 581:16–24.)

Plaintiff's allegations of medical malpractice rely on the opinion of Dr. Robert L. Shuman, who testified that Dr. Pratt and his surgical team breached the standard of care in the following six ways:

1. Failing to reinforce the left coronary artery button;
2. Performing a single-layer closure at the proximal suture line;
3. Making two attempts to repair the left coronary artery button;
4. Failing to stop Mr. Wright's bleeding;
5. Delaying Mr. Wright's CABG procedure for three hours; and
6. Failing to insert a left ventricular assistive device ("LVAD") while Mr. Wright was still in the operating room.

(Tr. 189:22–190:21.)

Defendant's expert in cardiothoracic surgery, Dr. Stuart W. Jamieson, testified that Dr. Pratt and his surgical team did not breach the standard of care in any of the six ways enumerated above. Dr. Jamieson supported his analysis with facts, his extensive knowledge of the standard of care, and his work throughout the United States and the world.

Dr. Jamieson is a preeminent cardiothoracic surgeon. He is currently the Endowed Chair and Distinguished Professor of Surgery as well as the Dean of Cardiovascular Affairs at University of California San Diego ("UCSD"). (Tr. 1075:1–5; Ex. 395.) Dr. Jamieson was formerly a professor and the director of the heart and lung transplantation program at Stanford University, where he was involved in the first successful heart and lung transplant in the world. (Tr. 1078:16–21.) Dr. Jamieson was also formerly a professor and the chief of heart surgery at the University of Minnesota, where he performed the first heart and lung, double lung, and single lung transplants in the Midwest. (Tr. 1078: 22–1079:11.)

Dr. Jamieson has performed heart surgery for forty-five years, worked in major training institutions, lectured throughout the United States and the world, established heart surgery programs throughout the world, and done demonstration surgeries in many countries. (Tr. 1084:23–1085:23.) He is very familiar with the standard of care in the United States, the world, and locally. (*Id.*) Dr. Jamieson has performed or supervised approximately 50,000 heart surgeries and has performed or supervised several hundred Bentall procedures. (Tr. 1082:12–15.) Dr. Jamieson participates as the senior surgeon in critical stages of multiple heart surgeries and trains cardiovascular surgeons in California, the United States, and throughout the world. (Tr. 1082:18–22, 1085:15–1086:3.) He has authored or co-authored over 500 publications regarding heart surgery and trained approximately fifty cardiovascular surgeons. (Tr. 1081:17–20, 1082:4–11.)

CONCLUSIONS OF LAW

The Federal Tort Claims Act directs the Court to apply the law of the State of California, which is where the alleged tort occurred. *See* 28 U.S.C. § 1346(b)(1); *Daly v.*

United States, 946 F.2d 1467, 1469 (9th Cir. 1991). Plaintiff has the burden of establishing by a preponderance of the evidence all of the facts necessary to prove the negligence of Defendant and that such negligence was the cause-in-fact of the complained-of injury. *Johnson v. Superior Court*, 143 Cal. App. 4th 297, 305 (Cal. Ct. App. 2006); *Fein v. Permanente Med. Grp.*, 38 Cal. 3d 137, 152 n.9 (Cal. 1985).

The elements for medical malpractice are: "(1) a duty to use such skill, prudence, and diligence as other members of the profession commonly possess and exercise; (2) a breach of the duty; (3) a proximate causal connection between the negligent conduct and the injury; and (4) resulting loss or damage." *Johnson*, 143 Cal. App. 4th at 305. California courts require "only that physicians and surgeons exercise in diagnosis and treatment that reasonable degree of skill, knowledge, and care ordinarily possessed and exercised by members of the medical profession under similar circumstances." *Mann v. Cracchiolo*, 38 Cal. 3d 18, 36 (Cal. 1985) *overruled on other grounds by Perry v. Bakewell Hawthorne, LLC,* 2 Cal. 5th 536 (Cal. 2017); *see also Landeros v. Flood*, 17 Cal. 3d 399, 408 (Cal. 1976); *Meier v. Ross Gen. Hosp.*, 69 Cal. 2d 420, 429 (Cal. 1968); *Allen v. Leonard*, 270 Cal. App. 2d 209, 215 (Cal. Ct. App. 1969). Ordinarily, the standard of care is a matter solely within the knowledge of experts and can only be proven through expert testimony unless the negligence is obvious to a layperson. *Johnson*, 143 Cal. App. 4th at 305; *Landeros*, 17 Cal. 3d at 410.

The law further acknowledges that there may be more than one recognized method of diagnosis or treatment, and a physician is not negligent if, in exercising his best judgment, he chooses a method which, in hindsight, turns out to be the wrong choice, or one not favored by other physicians. *Lawless v. Calaway*, 24 Cal. 2d 81, 87–89 (Cal. 1944); *Barton v. Owen*, 71 Cal. App. 3d 484, 501–02 (Cal. Ct. App. 1971); *Vandi v. Permanente Med. Grp., Inc.*, 7 Cal. App. 4th 1064, 1070 (Cal. Ct. App. 1992). "A difference of medical opinion concerning the desirability of one particular medical procedure over another does not, however, establish that the determination to use one of

the procedures was negligent." *Clemens v. Regents of Univ. of Calif.*, 8 Cal. App. 3d 1, 13 (Cal. 1970) (citing *Meier*, 69 Cal. 2d at 420).

To prove causation, the plaintiff must establish "'that the defendant's breach of duty . . . was a substantial factor in bringing about the plaintiff's harm.'" *Mayes v. Bryan*, 139 Cal. App. 4th 1075, 1092–93 (Cal. Ct. App. 2006), *as modified* (June 21, 2006) (quoting *Leslie G. v. Perry & Assocs.*, 43 Cal. App. 4th 472, 481 (Cal. Ct. App. 1996)). The traditional "but for" test of causation is necessarily subsumed under the "substantial factor" test. *Viner v. Sweet*, 30 Cal. 4th 1232, 1239 (Cal. 2003); *Mitchell v. Gonzales*, 54 Cal. 3d 1041, 1052 (Cal. 1991) ("'If the conduct which is claimed to have caused the injury had nothing at all to do with the injuries, it could not be said that the conduct was a factor, let alone a substantial factor, in the production of the injuries.'" (quoting *Doupnik v. Gen. Motors Corp.*, 225 Cal. App. 3d 849, 861 (Cal. Ct. App. 1990))).

Moreover, in a medical malpractice action, causation must be proven to a reasonable medical *probability*, rather than a reasonable medical *possibility*, based upon competent expert testimony. *Jones v. Ortho Pharm. Corp.*, 163 Cal. App. 3d 396, 403 (Cal. Ct. App. 1985) (emphasis added); *Morgenroth v. Pac. Med. Ctr., Inc.*, 54 Cal. App. 3d 521, 533–34 (Cal. Ct. App. 1976). "A possible cause only becomes 'probable' when, in the absence of other reasonable causal explanations, it becomes more likely than not that the injury was a result of its action." *Miranda v. Bomel Const. Co., Inc.*, 187 Cal. App. 4th 1326, 1336 (Cal. Ct. App. 2010). Accordingly, "[c]ausation is proven when a plaintiff produces sufficient evidence to allow the jury to infer that in the absence of the defendant's negligence, there was a reasonable medical probability the plaintiff would have obtained a better result." *Mayes*, 139 Cal. App. 4th at 1093 (internal citations and quotation marks omitted).

Plaintiff has failed to meet her burden to prove by a preponderance of the evidence that Dr. Pratt and his surgical team breached the standard of care. Each alleged breach of the standard of care is addressed in turn.

1. Left Coronary Artery Button

Dr. Shuman testified that Dr. Pratt's failure to reinforce Mr. Wright's thin left coronary artery button tissue upon creation of the anastomosis breached the standard of care. (Tr. 189:24–25.) Plaintiff has failed to carry her burden of proof with respect to this claim.

Dr. Shuman's testimony regarding the standard of care is problematic in multiple respects.[7] Dr. Shuman testified that "for the average, routine standard of care, 51 percent of the surgeons in the country who are doing occasional Bentalls" must reinforce the left coronary artery button "when [they] recognize that that tissue is thin." (Tr. 210:19–23.) The mere fact that a simple majority of surgeons performing occasional Bentall procedures reinforce the left coronary artery button when the tissue is thin does not render the choice not to reinforce the button a breach of the standard of care.[8] *See Clemens*, 8 Cal. App. 3d at 13 ("A difference of medical opinion concerning the desirability of one particular medical procedure over another does not, however, establish that the determination to use one of the procedures was negligent."); *Lawless*, 24 Cal. 2d at 87 ("[T]he fact that another physician or surgeon might have elected to treat the case

---

[7] Dr. Shuman offered testimony regarding another complication which could occur with the left coronary artery button, despite there being no evidence that such a problem had occurred in Mr. Wright's case. Dr. Shuman testified that the BioGlue Dr. Pratt used could have dripped from the proximal suture line anastomosis to the left coronary artery button and subsequently went into the left coronary artery button and blocked the coronary artery. (Tr. 220:01–15.) In response to the Court's inquiry regarding whether there was any suggestion that that had happened in this case, Dr. Shuman responded, "Well, it could. But what I am saying is it's another way you can block your button. As long as you recognize it and do your bypass quickly, you will get out of it." (*Id.*)

[8] Dr. Shuman admitted that he did not reinforce the left coronary artery button on one occasion:

> And I have also admitted that there are occasional surgeons—including me on one occasion—where I didn't do it, but I didn't do it because the tissue looked so good that I thought that it would be fine. And so in that sense, you could say I was below the standard of care, but it worked, and the patient did fine.

(Tr. 210:13–18.) Dr. Shuman's admission that "you could say I was below the standard of care," qualified by the fact that "it worked, and the patient did fine," seems to justify his self-alleged breach of the standard of care by the patient's positive outcome. Moreover, the phrase "occasional surgeons" does not correspond to Dr. Shuman's testimony that 49% of the surgeons in the country who do occasional Bentall procedures do not reinforce left coronary artery button tissue. (*See* Tr. 210:19–23.)

differently or use methods other than those employed by defendant does not of itself establish negligence."); *see also Barton*, 71 Cal. App. 3d at 501–02; *Vandi*, 7 Cal. App. 4th at 1070.

Indeed, a substantial number of the papers Dr. Shuman cited in support of his opinion do not support his position regarding reinforcement of the left coronary artery button. Dr. Jamieson reviewed the papers Dr. Shuman cited. (Tr. 1102:23–1104:15; Ex. 360.) Dr. Jamieson testified that of the seventeen papers he reviewed, the authors of eleven of the papers did not reinforce the button; the authors of two of the papers sometimes reinforced the button; the authors of two of the papers reinforced the button; and the issue of reinforcing the button was not relevant or brought up in two of the papers.[9] (*Id.*) Even excluding the two irrelevant papers, only a minority of the authorities Dr. Shuman cited reinforced the button. At best, Dr. Shuman's cited authorities show that cardiothoracic surgeons have different opinions regarding reinforcement of the left coronary artery button, undermining Dr. Shuman's testimony that there are no alternate positions on the issue.[10]

Even Plaintiff's exhibits which do note reinforcement of the left coronary artery button confirm that the choice not to reinforce the left coronary artery button upon construction does not automatically constitute a breach of the standard of care. For example, Plaintiff's Exhibit 111 notes that "the coronary ostia were harvested,

---

[9] For example, Dr. Jamieson reviewed Plaintiff's Exhibit 105 and determined that the article does not reinforce the proximal suture line or the left coronary artery button. (Tr. 1147:05–22.) Dr. Jamieson also reviewed Plaintiff's Exhibit 112 and determined that the article does not call for reinforcement of the proximal suture line or the left coronary artery button. (Tr. 1147:25–1148:13.) Plaintiff's Exhibit 114 also does not note reinforcement of the coronary artery buttons. (Ex. 114 at 1027.) And Plaintiff's Exhibit 71 does not require that the left coronary artery button anastomosis be routinely reinforced with felt or pericardium. (*See* Ex. 71.) In comparison, Plaintiff's Exhibits 69 and 70 note the use of a thin strip of felt to reinforce the left coronary artery button. (Tr. 213:11–14, 217:25–218:01.) Similarly, Plaintiff's Exhibits 115 and 116 note that a Teflon felt strip was used to reinforce the coronary artery buttons. (Ex. 115 at 699; Ex. 116 at 1455.)

[10] The Court inquired of Dr. Shuman's opinion regarding reinforcement, "Is this something where reasonable minds can differ and so you have one school of thought that has this view, but then you have others that take an alternate position?" (Tr. 195:02–04.) Dr. Shuman responded, "No." (Tr. 195:05.)

surrounded by a large portion of aortic wall, allowing the coronary buttons to be sutured in a double layer, with an 'endo-button' buttress technique." (Tr. 226:01–04; Ex. 111 at 247.) This exhibit does not appear to require the use of felt or pericardium to reinforce the left coronary artery button. (*Id.*) Plaintiff's Exhibit 109 states, "A second layer of sutures was often placed circumferentially for reinforcement." (Ex. 109 at 1269). This article does not require reinforcement of the left coronary artery button or require the use of Teflon felt or pericardium for reinforcement. (*Id.*) Plaintiff's Exhibit 129 also does not require reinforcement of the left coronary artery button; it expresses a preference for reinforcement with pericardium. (Tr. 231:04–07 ("*Often* this suture line is buttressed and reinforced with a strip of autologous pericardium on the coronary button for a more secure anastomosis." (emphasis added)); Tr. 231:19–24 ("The suture bites must be very close together and *preferably* buttressed with a pericardial strip." (emphasis added)).) And Joint Exhibit 10, Dr. Carrel's instructional film, did not reinforce the left coronary artery button.[11] (*See* Jt. Ex. 10.)

Moreover, the weight of the evidence does not support Dr. Shuman's testimony that reinforcement of the left coronary artery button carries no risks. (Tr. 332:7–9.) Dr. Jamieson testified, and Dr. Pratt and Dr. Ramirez echoed, that felt reinforcement of the left coronary artery button anastomosis can kink and narrow the opening of the artery. (Tr. 1142:2–25, 769:11–770:1, 1033:19–1035:3.) If bleeding from the button subsequently occurs, which Dr. Jamieson testified is "not uncommon," felt reinforcement can impede repair by making it extremely difficult for a surgeon to determine where the bleeding is originating from. (Tr. 1142:12–18.) In line with this view, Defendant's Exhibit 370 states, "A continuous 5-0 polypropylene suture is utilized to secure the

[11] Plaintiff argues that the film notes that a pericardial strip should be used to reinforce aortic tissue at the left coronary artery button if the tissue is "friable." (Dkt. No. 97 at 4.) Beyond the fact that the tissue was noted to be thin, as is standard in Bentall procedures, there is no indication in the record that the tissue was friable when the anastomosis was created.

coronary buttons to the respective coronary ostia. Teflon felt is not recommended."[12] (Ex. 370-007.) On its face, this sentence indicates that a single-layer continuous suture line was utilized to form the left coronary artery button anastomosis, and that Teflon is not recommended for reinforcement purposes. While this sentence does not indicate whether pericardium is recommended instead of felt, the first sentence plainly suggests that a single-layer closure was sufficient.

The Court credits Dr. Jamieson's testimony regarding reinforcement of the left coronary artery button and concludes that Dr. Jamieson's testimony is amply supported by his extensive experience and the factual bases underlying his opinion. Dr. Jamieson testified that Dr. Pratt's method of constructing the left coronary artery button anastomosis was within the standard of care and is the same method taught at UCSD, Stanford, and the University of Minnesota.[13] (Tr. 1110:14–1111:3.) In his own experience performing and supervising hundreds of Bentall procedures, Dr. Jamieson has never reinforced the left coronary artery button on the initial anastomosis. (Tr. 1140:16–21.) Dr. Jamieson further testified that the majority of the surgeons in the United States, as well as every institution of which he is aware, do not reinforce the left coronary artery button on the initial anastomosis. (Tr. 1207:23–1208:5; 1139:02–11.) He based his opinion upon his forty-five years of experience performing heart surgeries, his work at

---

[12] Dr. Shuman initially testified that he did not believe that he had seen this exhibit. (Tr. 337:25–338:02.) After being reminded that he had reviewed it at his deposition, Dr. Shuman testified that he did not recall that occurring. (Tr. 338:03–05.) After being read portions of his deposition transcript indicating the contrary, Dr. Shuman stated, "I don't think I was ever shown this. I think you referenced it, but I don't think I ever was shown it." (Tr. 338:06–339:05.) He repeated, "As I said, I haven't received it, and I haven't read it, and I haven't looked at it before." (Tr. 339:10–14.) He subsequently claimed that he "wasn't allowed to look at it" at his deposition. (Tr. 339:15–25.) However, contrary to Dr. Shuman's assertions, the deposition transcript expressly reflects the fact that Dr. Shuman was handed the document, given time to review the document, and actually reviewed the document during his deposition. (Tr. 340:01–342:02.)

[13] Dr. Ramirez corroborated Dr. Jamieson's testimony about the techniques taught at major institutions, testifying that he and Dr. Pratt used the same method of modified Bentall operations on Mr. Wright as he was trained to do at the Rush University Medical Center, which is where Dr. Shuman trained, and Northwestern. (Tr. 1023:2–1024:3, 1027:7–15, 181:4–5.)

major teaching hospitals, his travels as a visiting professor throughout the United States, and his reading and teaching. (Tr. 1110:14–1111:3.)

Moreover, Dr. Jamieson testified that in every Bentall procedure, the aortic wall is necessarily thinner than the normal aorta due to an aneurysm. (Tr. 1139:2–11.) It is accordingly "standard in a Bentall to see thin tissue." (*Id.*; *see also* Tr. 1140:12–15, 1221:13–1222:1, Tr. 1031:03–16 (Dr. Ramirez's testimony that Mr. Wright's tissue was abnormal "by definition," given the aneurysm).) Dr. Jamieson noted that when the button is sewn onto the graft, "it's possible that the needle hole will enlarge," which is referred to as "tearing," and that the fact of tearing does not suggest that the tissue used was unduly thin. (Tr. 1221:07–1222:01.) Dr. Jamieson further testified that subsequent tissue tearing or bleeding at an anastomosis does not mean that the anastomosis was wrongly constructed or that the tissue used was unduly thin. (Tr. 1224:17–25.) In fact, Dr. Jamieson testified that bleeding and tearing occurs even with normal tissue with no integrity concerns: "[W]e see leaks and tears, unfortunately, all the time in heart surgery. We see it in normal tissue. We see it when we do coronary surgery. We see it when we do aortic aneurysm surgery." (Tr. 1221:17–21; *see also* Tr. 1046:01–05 (Dr. Ramirez's testimony that bleeding can occur with any thickness of coronary artery button), Tr. 1044:20–21 (Dr. Ramirez's testimony that "bleeding from any anastomosis can happen").) Indeed, even Dr. Jamieson has on occasion reinforced the left coronary artery button after discovering bleeding—but never upon the initial construction. (Tr. 1140:22–1141:04.) He noted that "[e]very experienced surgeon has had bleeding with a Bentall," and that "quite frequently, [a surgeon] might, in doing a reparative stitch, use a buttress or some sort of reinforcement at that point, but not primarily."[14] (*Id.*; *see also* Tr. 1224:21–

[14] In light of the above, Dr. Ramirez's testimony that he was not surprised that the tissue tore or that bleeding was subsequently encountered, given the abnormality of the tissue, does not indicate that reinforcement of the left coronary artery button was necessary upon construction. (Tr. 1067:22–1068:8.)

25 ("We frequently see bleeding from where we do an anastomosis, and that's just a fact of heart surgery.").)

Finally, while the evidence shows that the tissue used for the left coronary artery button was thin, as is standard in Bentall procedures, the weight of the evidence does not show that the tissue was unduly thin or unsuitable for use at the time Dr. Pratt constructed the anastomosis. (Tr. 1031:12–25, 767:6–10, 1045:14–19 (Dr. Ramirez's testimony that he has seen tissue both thinner and thicker than that used for Mr. Wright's coronary artery button anastomoses, and that Mr. Wright's tissue "did not stand out . . . as being markedly abnormal that [he] felt [they] could not safely use it").) To create the left coronary artery button, Dr. Pratt and Dr. Ramirez assessed the integrity of Mr. Wright's aortic tissue by how it appeared, how it felt when the tissue was being cut and the coronary artery buttons were created, how the tissue handled when picked up with surgical forceps, and how the tissue held sutures when the stitches were done. (Tr. 734:15–735:5, 739:9–740:9, 1028:4–10, 1032:12–16, 1033:2–9.) In addition, all of Mr. Wright's anastomoses, including the left coronary artery button, were pressure-tested twice to ensure, as best as possible before the bypass was discontinued, that they would not leak. (Jt. Ex. 4:003; Tr. 739:9–740:16, 759:15–24, 1033:2–9.) There was no evidence of leaking or insufficiency of the left coronary artery button anastomosis after these various assessments. (Tr. 1033: 7–9.)

In light of the above, Plaintiff has not met her burden to prove by a preponderance of the evidence that Dr. Pratt breached the standard of care by failing to reinforce the left coronary artery button tissue upon creation of the anastomosis.

a. Plaintiff's New Argument

In what appears to be a new argument raised for the first time in her closing brief, Plaintiff argues that Dr. Pratt breached the standard of care by exercising "very poor surgical technique" in constructing the left coronary artery button anastomosis. (Dkt. No. 93 at 11.) Specifically, Plaintiff singles out a sliver of Dr. Pratt's testimony to argue that Dr. Pratt created a problem with about 20–25% of the left coronary artery button suture

line upon the initial anastomosis. (*Id.*) Dr. Shuman did not identify this alleged breach of the standard of care in his opinions. In fact, the culled testimony Plaintiff relies upon to support this claim was introduced during Defendant's case and offered in response to questioning by defense counsel. Setting aside the fact that this argument is newly raised, Plaintiff has not carried her burden to prove by a preponderance of the evidence that Dr. Pratt committed such a breach.

The evidence in the record shows that Dr. Pratt duly assessed the integrity of the tissue and properly created and tested the left coronary artery button anastomosis. *See supra* Part I. Dr. Shuman, after being impeached with his deposition testimony, agreed that Dr. Pratt properly tested the anastomoses when he first completed the proximal suture line and the coronary artery buttons. (Tr. 328:19–329:7.)

Nonetheless, the "ultimate test" is to allow the heart to beat and pump blood through at the left coronary artery button anastomosis. (Tr. 1032:1–1033:9.) Bleeding was observed from the area of the left coronary artery button. Dr. Jamieson testified that the fact that bleeding or tearing of the tissue occurs does not mean that the anastomosis was done incorrectly, or that the tissue was unduly thin. (Tr. 1224:17–25, 1221:07–1222:01.) Dr. Jamieson observed, "We frequently see bleeding from where we do an anastomosis, and that's just a fact of heart surgery." (Tr. 1224:21–25.)[15]

The context of Dr. Pratt's testimony makes clear that he was speaking about his decision to add additional sutures to aid hemostasis at the left coronary artery button on his first repair attempt. Dr. Pratt testified, "I saw potential areas of bleeding and I knew I had narrowed it down to a fairly small portion on the clock, and I put sutures into where I thought the most likely spots of bleeding could be." (Tr. 778:20–23.) Dr. Pratt further testified about the necessity of either "insert[ing] additional sutures or tak[ing] down and

---

[15] In light of this testimony, and in light of the fact that the tissue was fine upon construction of the anastomosis, Dr. Pratt's observation that the tissue had started to tear when he attempted to repair the left coronary artery button does not show that he breached the standard of care by failing to initially reinforce the button. (Tr. 777:02–17.)

redo[ing] the anastomosis in order to achieve hemostasis." (Tr. 781:7–10.) Counsel subsequently asked,

> Q: Would it be fair to say you inserted additional sutures? Correct?
> A: It was my assessment that's what it needed.
> Q: Why didn't you redo the entire anastomosis?
> A: Because of what I found when I just described how I evaluated the anastomosis itself. 75, 80 percent of it was—I knew it wasn't the problem. It's just that small portion. So I want to stepwise address that and give that the small suture.

(Tr. 781:11–19.)

After encountering bleeding, Dr. Pratt set about trying to ascertain the source of the bleeding. It is plain from Dr. Pratt's testimony that in the process of zeroing in on the problem, he eliminated 75 to 80% of the suture line as being the source of the problem. The fact that he undertook measures to address the remaining 20 to 25% of the suture line does not mean that Dr. Pratt chose not to fully suture the left coronary artery button anastomosis on the first construction, or that he employed deficient surgical technique.

Nor does Dr. Ramirez's testimony avail Plaintiff's burden of proof. Dr. Ramirez testified on direct examination that

> From the inferior aspect of the anastomosis, there was a small area where the sutures were not as taut, and so they had some laxity to it. So we tightened up that suture—or Dr. Pratt did, and then threw an interrupted stitch right at that area where there was some laxity to the running stitch.

(Tr. 1039:11–15.) Dr. Ramirez testified that the sutures may become less taut upon re-pressurizing the heart.

> Q: And in terms of the—where you said it was a little bit lax, is that something that is determined when you are—when the heart is finally being tested, when it's beating and has blood in it? Is that correct?
> A: Yes. Once the heart is pressurized by normal systemic pressures, the tissues will stretch. So as the tissues stretch, the suture stretches, right? And so this is not uncommon to see that an anastomosis that you had run—done a running stitch with tension on it, once it's pressurized, that can loosen.
> Q: And would it also be correct that you don't want to overtighten an anastomosis because that could cause other sorts of problems?

> A: Yes. If you put too much tension on the anastomosis, then you can run the risk of tearing the tissue itself.

(Tr. 1039:16–1040:05.) It is clear from Dr. Ramirez's testimony that exposure of the anastomosis to normal systemic pressures naturally stretches the tissues, which in turn can loosen the sutures. (*See also* Tr. 1221:07–1222:01.) The fact that the sutures were less taut after the heart was re-pressurized does not compel the conclusion that 20–25% of the anastomosis was improperly sutured to begin with. Indeed, suturing the left coronary artery button anastomosis too tightly upon construction may heighten the risk of tearing.

The Court concludes that Plaintiff has failed to meet her burden to prove by the preponderance of the evidence that Dr. Pratt breached the standard of care by not fully suturing the left coronary artery button upon construction.

2. Proximal Suture Line

Dr. Shuman testified that Dr. Pratt's use of a single-layer closure at the proximal suture line breached the standard of care. (Tr. 190:01–03.) Dr. Shuman faults Dr. Pratt for failing to reinforce the proximal suture line with a strip of felt or use a second layer of running prolene sutures. (Tr. 236:15–21.) Plaintiff has failed to carry her burden of proof with respect to this claim.

As a starting matter, no bleeding was detected from the proximal suture line during the surgery. Dr. Shuman testified that reinforcement of the proximal suture is required in part because the proximal suture line is difficult to visualize after a patient is removed from bypass. (Tr. 192:06–15.) However, the evidence shows that Dr. Pratt tested all of the anastomoses for bleeding before removing Mr. Wright from bypass. Specifically, Dr. Pratt pressure-tested, to mimic actual blood pressure, all anastomoses, including the proximal suture line, before he removed the aortic clamp in order to ensure that the anastomoses were hemostatic. (Tr. 759:25–763:6.) Moreover, because bleeding in the proximal suture line area is difficult to visually detect, Dr. Pratt repeatedly tested for bleeding, both in the operating room and in the ICU, by using white gauze pads and a

white hemostatic powder. (Tr. 759:25–763:6, 764:7–765:7.) Dr. Pratt and Dr. Ramirez testified that at no point during or after the surgery did they detect bleeding from the proximal suture line. Dr. Cornelissen also testified that he was unaware of any surgical bleeding from the proximal suture line.

Dr. Shuman's testimony regarding the standard of care is deficient. Dr. Shuman testified that "the vast majority—51 percent of cardiac surgeons" use a second-layer closure at the proximal suture line to control potential sources of bleeding. (Tr. 359:12 – 360:05.) Upon the Court's observation that 51% does not constitute a "vast majority," but rather, only a "simple majority," Dr. Shuman merely acknowledged that "[t]here are *some* [surgeons] that choose not to" reinforce the proximal suture line. (*Id.* (emphasis added); *see also* Tr. 360:21–23 (referring to the number of people who do not choose to reinforce as "a *small* number of people" (emphasis added)).) That a simple majority of surgeons reinforce the proximal suture line does not render the choice not to reinforce the proximal suture line a breach of the standard of care. *See Clemens*, 8 Cal. App. 3d at 13; *Lawless*, 24 Cal. 2d at 87; *Barton*, 71 Cal. App. 3d at 501–02; *Vandi*, 7 Cal. App. 4th at 1070.

This is further belied by the papers Dr. Shuman cited in support of his opinion. Dr. Jamieson reviewed the papers Dr. Shuman cited. (Tr. 1102:23–1104:15; Ex. 360.) Dr. Jamieson testified that of the seventeen papers he reviewed, the authors of seven of the papers did not reinforce the proximal suture line; the authors of two of the papers sometimes reinforced the proximal suture line; the authors of four of the papers reinforced the proximal suture line; and the issue of reinforcing the proximal suture line was not relevant or brought up in four of the papers. (*Id.*) Even excluding the four irrelevant papers, only a minority of the authorities Dr. Shuman cited reinforced the proximal suture line. At best, Dr. Shuman's cited authorities show that cardiothoracic surgeons have different opinions regarding reinforcement of the proximal suture line,

casting doubt on Dr. Shuman's testimony that there are no alternate positions on the issue.[16]

For one, Dr. Shuman misidentified one of the authorities as supporting his opinion regarding reinforcement of the proximal suture line. Specifically, Dr. Shuman cited Dr. Coselli's article, "Valve-Sparing Aortic Root Replacements: Early and Midterm Outcomes in 83 Patients." (Ex. 109). He testified, "[Dr. Coselli] is talking about the proximal anastomosis. 'A second layer of sutures was often placed circumferentially for reinforcement. After the distal anastomosis was completed, an opening was created in the graft of the right coronary attachment.'" (Tr. 238:17–22.) On recross-examination, Defendant's counsel questioned Dr. Shuman about Dr. Coselli's article, asking, "There's nothing here that talks about the proximal suture line, though, is there?" (Tr. 363:15–16.) Dr. Shuman admitted that the portion of the article he had formerly cited was in fact "talking about the left button," not the proximal suture line. (Tr. 363:17.)

Even a number of the works Dr. Shuman cited at trial do not indicate that performing a single-layer closure is necessarily a breach of the standard of care. Dr. Shuman read a line from Plaintiff's Exhibit 129: "'In addition, a Teflon strip *can* be used to buttress the proximal suture line. This reduces the possibility of leaks at the aortic root.'" (Tr. 231:01–03 (emphasis added); *see also* Tr. 232:16–24 (quoting the same language from a later edition of the book).) This book notes that a Teflon strip can be used at the proximal suture line anastomosis; it does not indicate that the use of interrupted horizontal mattress sutures with pledgets of Teflon felt, rather than a strip of

---

[16] *See supra* n.10. Dr. Shuman's own cited authorities show that there are differing approaches regarding the proximal suture line. For example, Plaintiff's Exhibit 71 does not require that the proximal suture line be reinforced with felt or pericardium. Dr. Shuman read from Exhibit 71 the following: "'If the aortic wall integrity is suspect, a 4- to 5-millimeter strip of PTFE felt *may* be incorporated in the distal suture line to minimize blood loss from the suture pull-through.'" (Tr. 221:07–10 (emphasis added).) The article repeats the same regarding the proximal suture line. (Ex. 71 at 685–86; Tr. 221:11–12.) On the other hand, Plaintiff's Exhibit 111 states that "an additional suture of 3-0 Prolene was used to join the cut edge of the aortic wall and the prosthetic sewing ring." (Ex. 111 at 247.)

felt, breaches the standard of care. Similarly, Dr. Shuman's quotation from Plaintiff's Exhibit 114 also does not mandate a double-layer closure at the proximal suture line. Rather, it indicates, "[C]are is taken to make this tandem suture line hemostatic. Extra sutures, *if judged necessary*, are placed at this time." (Tr. 233:23–234:02 (emphasis added).) In fact, in his deposition, Dr. Shuman testified that while he has used double layers of sutures in "the vast majority" of the Bentall procedures he performed, there was one in which he "didn't because [the patient's] tissues were frail, and there just wasn't enough to really sew back onto the graft, but she had no bleeding." (Tr. 310:06–18.)

Of note is the fact that Dr. Pratt did reinforce the proximal suture line, just not with a double-layer closure or a strip of felt.[17] Dr. Pratt used interrupted horizontal mattress sutures with small pledgets of Teflon felt "all the way along the aortic annulus," before placing a thin layer of BioGlue along the proximal suture line. (Jt. Ex. 4-003.) As Dr. Ramirez testified, "Because [the] annular stitches already come pledgeted, . . . that's essentially a reinforcement in and of itself." (Tr. 1027:16–1028:02.) Dr. Jamieson testified, based upon his "45 years of heart surgery and seeing the way that people do it throughout the United States and at three major university hospitals [he] ha[d] worked at," that Dr. Pratt's method of performing the proximal suture line anastomosis conformed to the standard of care. (Tr. 1102:16–22.) Specifically, Dr. Jamieson testified that using interrupted horizontal mattress sutures pledgeted with Teflon is not only the way he has seen the proximal suture line anastomosis done at UCSD, Stanford, and the University of Minnesota, but also "at almost every major institution." (Tr. 1105:01–10.) Dr. Jamieson further testified that the majority of the surgeons in the United States do not reinforce the proximal suture lien with a strip of Teflon. (Tr. 1207:23–1208:5.)

[17] At one point, Dr. Shuman inaccurately seemed to suggest that Dr. Pratt did not use any felt at all at the proximal suture line. (Tr. 236:16–20 ("Well, all [Dr. Pratt] did was the interrupted sutures, and he didn't put any felt down there.").)

Indeed, Dr. Carrel's instructional film used interrupted pledgeted horizontal mattress sutures, (*see* Jt. Ex. 10), and Defendant's Exhibit 370 reflected the same, stating, "The selected replacement valve is secured to the aortic annulus with inverted horizontal mattress sutures of 2-0 polyester sutures with pledgets," (Ex. 370 at 007; Tr. 1107:20–1110:05).[18] Dr. Jamieson's testimony is further corroborated by exhibits Dr. Shuman cited at trial, Plaintiff's Exhibits 70 and 72.[19] (Tr. 222:05–224:18.) Both exhibits state that the proximal suture line anastomosis is performed with interrupted pledgeted mattress sutures, which is exactly what Dr. Pratt did.[20] (Ex. 72 at 2233; Ex. 70 at 1067; Jt. Ex. 4:003.) Plaintiff's Exhibit 115 also states that "a series of pledgeted mattress sutures were placed" to compose the proximal suture line. (Ex. 115 at 699.) And

---

[18] Dr. Shuman repeatedly denied having reviewed this exhibit. *See supra* n.12. In his deposition, Dr. Shuman remarked, "Well, what they are talking about on the aortic root, they are saying on the coronary buttons, Teflon felt is not recommended. And you know, all I can say is that that's the opinion of that surgeon. But—and within the standard of care, he is entitled to his opinion." (Tr. 341:05–11.) Defendant's counsel questioned Dr. Shuman at the deposition, "Does this article say that you need a second layer of sutures on the proximal and anastomotic line?" Dr. Shuman responded, "It does not." (Tr. 341:15–18.)

At trial, Dr. Shuman may have confused two authorities written by Dr. Kron: Defendant's Exhibit 370, which was published in 2014, and Plaintiff's Exhibit 110, which was published in 1995 and which notes reinforcement of the proximal suture line. (Ex. 110 at 1130; Tr. 237:5–238:03.) In any event, Exhibit 370, which is more current, does not advocate reinforcement of the left coronary artery button and does not discuss reinforcement of the proximal suture line with a second-layer closure or a strip of felt.

[19] Dr. Shuman's quotation from Exhibit 70 appears to discuss using a one-centimeter cuff of Teflon felt at the distal suture line, not the proximal suture line. (*See* Ex. 70 at 1067 (discussing the use of interrupted pledgeted sutures at the proximal suture line, followed by construction of the left coronary artery button, followed by construction of the distal suture line with reinforcement by a Teflon felt cuff, finally followed by construction of the right coronary artery button); Tr. 218:06–10.) Dr. Shuman also cites Plaintiff's Exhibit 69, the Third Edition of Dr. Cohn's *Cardiac Surgery in the Adult*, from circa 2003. (Tr. 212:22–217:04.) The Third Edition pre-dates the Fourth Edition (Plaintiff's Exhibit 70), which was published in 2012, the year of Mr. Wright's surgery. In any event, even the Third Edition does not require the reinforcement of the proximal suture line. It states that "[a] second suture line of 4-0 running polypropylene suture *can* be used to approximate the aortic remnant to the newly secured valved conduit sewing ring to aid in hemostasis." (Tr. 213:05–07 (emphasis added).)

[20] Although Exhibit 72 does not mention using a second layer of sutures at the proximal suture line, it does mention using a strip of Teflon felt at the distal suture line. (Ex. 72 at 2233.) Dr. Shuman nonetheless testified, "This is really talking about the proximal and distal, and basically [they are] identical." (Tr. 223:11–16.)

Plaintiff's Exhibit 116 states that "[a] series of pledgeted mattress sutures are then placed" to create the proximal suture line, and that "[w]ith selection of a prosthesis of appropriate size to fit snugly into the annulus, and the use of the suture technique as described, bleeding does not occur at the proximal anastomosis." (Ex. 116 at 1455.)

Plaintiff asserts that Dr. Jamieson's testimony about the proximal suture line is not credible.[21] (Dkt. No. 93 at 10.) The Court finds Dr. Jamieson's testimony to be supported by Dr. Jamieson's extensive experience and explanation of the factual bases underlying his opinion. Dr. Jamieson testified that bleeding from the proximal suture line is "very rarely addressed," given that the tissue along the proximal suture line is comprised of "normal," "thickened valve tissue." (Tr. 1157:25–1158:05.) Dr. Jamieson testified that he has never reinforced the proximal suture line with a strip of felt or a second-layer closure, and that he has never seen anyone do so. (Tr. 1107:05–09.) He explained that "where [a surgeon] plac[es] the sutures is through thick fibrous tissue of the bicuspid valve, [which is] very strong tissue. In fact, it's overstrong. . . . And so that's why most people that I am aware of don't reinforce that. There's no need to reinforce. It's strong tissue." (Tr. 1105:09–19.)

In light of the above, the Court concludes that Plaintiff has failed to meet her burden of proof to establish that Dr. Pratt breached the standard of care by performing a single-layer closure at the proximal suture line anastomosis.

a. Plaintiff's New Argument

In what appears to be a new argument raised for the first time in her closing argument, Plaintiff argues that Dr. Pratt breached the standard of care as to the proximal suture line by leaving "a hole" and by failing to "fully suture, inspect, reinforce or bio-glue the suture line." (Dkt. No. 93 at 8–9; Dkt. No. 97 at 5.) Plaintiff relies on Dr. Luzi's

---

[21] Plaintiff argues that Dr. Jamieson did not cite to written authority identifying any negative consequences of using a strip of felt or pericardium or a double-layer closure at the proximal suture line. (Dkt. No. 93 at 9.) However, the lack of such evidence does not compel the conclusion that the standard of care required Dr. Pratt to perform a double-layer closure in this case.

initial conclusion that there was a "defect" in the back of the conduit area. Setting aside the fact that this argument is newly raised, Plaintiff has not carried her burden to prove by a preponderance of the evidence that Dr. Pratt committed such a breach.

First, none of the parties' experts in cardiothoracic surgery and pathology found the "defect" identified by Dr. Luzi in the autopsy report. Dr. Luzi testified that he initially believed that there was a "defect" in the back of the graft conduit as it anastomosed to the heart. Subsequently, in a video-recorded examination on November 17, 2014, Dr. Shuman, Dr. Hiserodt, Dr. Jamieson, and Dr. Swalwell inspected Mr. Wright's heart. Dr. Hiserodt, Dr. Swalwell, and Dr. Jamieson all concluded that the "defect" identified by Dr. Luzi was not present. Even Dr. Shuman testified that Dr. Luzi "was incorrect," and that the "defect" was in fact "just a piece of redundant aortic tissue that hadn't been cut away."[22] (Tr. 318:21–319:01.) Nor did the evidence show, or the experts conclude, that the proximal suture line lacked BioGlue. To the contrary, the evidence shows that a thin layer of BioGlue was placed along the suture line. (Jt. Ex. 4:003.)

Dr. Luzi reviewed this video-recorded examination prior to his deposition on December 12, 2014. After reviewing the examination and listening to both parties' experts discuss the anatomy of Mr. Wright's heart and the procedure performed, Dr. Luzi, who had previously been unfamiliar with the conduit used in the procedure, acknowledged that his original conclusion about the "defect" was mistaken. Dr. Luzi realized that his probe had merely passed easily into a "blind space" between the graft and Mr. Wright's native tissue that remained following removal of the aneurysm, and that no actual defect was present. (Tr. 580:13–23, 581:16–24.) Dr. Luzi also testified that this blind space did not have BioGlue; he did not testify that the proximal suture line lacked BioGlue. (Tr. 579:03–11.)

---

[22] Dr. Jamieson testified that the standard of care does not require the remnants of the aortic tissue from the aneurysm be sutured to the conduit. (Tr. 1107:10–12.)

The Court concludes that Plaintiff fails to carry her burden to prove by a preponderance of the evidence that Dr. Pratt breached the standard of care by leaving a hole in the proximal suture line and by failing to BioGlue the suture line.

3. Two Repair Attempts of the Left Coronary Artery Button

Dr. Shuman opined that Dr. Pratt's two repairs of the left coronary artery button breached the standard of care. (Tr. 190:4–6.) Plaintiff has failed to carry her burden of proof with respect to this claim.

a. First Repair Attempt

Dr. Shuman faults Dr. Pratt for failing to look at the outside of the button when he attempted his first repair from the inside, and for merely adding additional sutures, rather than reinforcing the left coronary artery button on the first repair attempt. (Tr. 197:10–198:01, 243:09–16, 315:21–316:09.) The weight of the evidence does not support Dr. Shuman's opinion.

First, Dr. Pratt testified that he inspected the outside of the graft while he made his first repair of the left coronary artery button, (Tr. 775:12–18), and Dr. Shuman was unable to affirmatively cite to evidence showing that Dr. Pratt did not look at the outside of the graft when he repaired it, (Tr. 330:08–22).[23] Second, the weight of the evidence indicates that Dr. Pratt acted within the standard of care in choosing to add additional sutures to aid hemostasis during his first repair attempt. Dr. Pratt and Dr. Ramirez testified that Dr. Pratt's choice to reinstate bypass, cross-clamp the aorta, open the conduit, and add additional sutures to tighten the suture line comported with the algorithm of treatment in which they were trained. (Tr. 1038:17–1039:9, 1041:12–1042:5, 779:3–10.)

---

[23] While Dr. Shuman characterizes Dr. Pratt's method of repairing the button from the inside as "unorthodox," Dr. Shuman acknowledges nonetheless, "That was [Dr. Pratt's] choice." (Tr. 243:12–14.) That Dr. Pratt repaired the button from the inside does not seem to be the focus of Dr. Shuman's criticism. Rather, Dr. Shuman focuses on his belief that Dr. Pratt's choice to repair the button from the inside necessarily entailed Dr. Pratt's ignoring the outside of the button.

Dr. Jamieson opined that Dr. Pratt's first repair attempt was within the standard of care. (Tr. 1112:12–15, 1155:15–19.) Dr. Jamieson testified that Dr. Pratt's approach was "very reasonable," and that opening the graft transversely and attempting to locate the site of bleeding, rather than redoing the anastomosis, was within the standard of care. (Tr. 1111:19.) Specifically, Dr. Jamieson testified:

> So his approach, which is a very reasonable approach, was to arrest the heart again, make an incision here, low down in the graft, so you could directly visualize the button, looking at it this time from the inside but looking at it directly rather than trying to pull this up and to pull the button up and to pull the left main up to try and see behind, which may make any bleeding potentially worse.

(Tr. 1111:19–25.) Rather than "take down and redo the whole anastomosis," which "obviously would take a long time" and would result in "many needle holes all around the periphery of the button from the first anastomosis," Dr. Jamieson opined that "the prudent person would try and localize the area that was bleeding and address that" in the same manner Dr. Pratt did. (Tr. 1112:06–15.)

Finally, Plaintiff raises in her closing brief an argument based upon Dr. Ramirez's testimony. (Dkt. No. 93 at 13.) Specifically, Plaintiff suggests that Dr. Pratt "place[d] a 2 mm pledgeted suture in a 4 mm opening . . . , approximately half of which consisted of the opening to the circumflex artery, [thereby] disrupting the flow of blood" in the circumflex artery.[24] (Dkt. No. 97 at 2 n.1.) Dr. Ramirez testified, "I think when we opened the graft, if I remember correctly, I think he used a Teflon reinforcement stitch," which was a single stitch, reinforced by a Teflon pledget. (Tr. 1047:01–10.) After having his recollection refreshed with the operative note, Dr. Ramirez nonetheless again testified, "It's my recollection that he used an interrupted Teflon pledgeted stitch" in the inside of the graft. (Tr. 1049:05–08.)

---

[24] Plaintiff appears to argue that Dr. Pratt placed a felt pledget "on the *inside of the left coronary artery* on the first repair." (Dkt. No. 93 at 13 (emphasis in original).) This extends well beyond Dr. Ramirez's testimony that a pledgeted stitch was placed to repair the button from the inside of the graft.

However, the weight of the evidence does not support Dr. Ramirez's uncorroborated recollection. First, neither the operative note nor Dr. Pratt's testimony indicates that Dr. Pratt used a Teflon pledget for reinforcement during this first attempt to repair the left coronary artery button. Second, the left coronary artery ostium was noted to be unremarkable in Dr. Luzi's autopsy report, and both Dr. Swalwell and Dr. Jamieson testified that there was no occlusion or narrowing at the left coronary artery button or within the lumen of the artery. (Tr. 899:25–900:12, 1138:01–08.) Finally, and importantly, even if Dr. Ramirez's shaky recollection were correct, "any kinking of the left main coronary [artery] or any narrowing of the button would have affected four-fifths of the heart," given Mr. Wright's left-dominant coronary system.[25] (Tr. 1215:5–11.) Rather, only the inferior wall of Mr. Wright's heart was affected.

The weight of the evidence shows that Dr. Pratt's first repair attempt did not breach the standard of care.

b. Second Repair Attempt

Dr. Shuman does not fault Dr. Pratt's choice to add a stitch reinforced with pericardium.[26] (Tr. 215:12–16 ("That's what Dr. Pratt did on the second repair, just took a piece of pericardial tissue. That's perfectly fine. I just wish he had done it on the first go-around.").) Dr. Ramirez testified that he was trained to use the same repair technique at Rush and Northwestern. (Tr. 1051:10–19.) And Dr. Jamieson opined that Dr. Pratt's second repair attempt was within the standard of care. (Tr. 1155:20–23.)

---

[25] The left main coronary artery branches off into the left anterior descending artery and the circumflex artery. (Tr. 1160:03–05.) Had Dr. Pratt narrowed the left coronary artery button or kinked the left main coronary artery, an even larger area of the heart would have been affected, compared to the effects of a compromised circumflex artery.

[26] Dr. Shuman criticizes Dr. Pratt for not cross-clamping or fully depressurizing the heart when he added the stitch with a piece of pericardium, as it makes it more difficult to place a repair stitch, but nonetheless states that Dr. Pratt "was able to do it." (Tr. 198:11–15, 205:10–12.)

Dr. Shuman's main opinion is that Dr. Pratt breached the standard of care by kinking the circumflex artery during his repair attempts. (Tr. 246:06–18, 248:23–249:01.) The weight of the evidence does not support Dr. Shuman's opinion.

Dr. Pratt wrote in the operative report:

> Because of the location of the stitch required for hemostasis, the ongoing and increasing level of inotropic support required and the inferior wall abnormality, which corresponds to the patient's left dominant system with the PDA coming off the circumflex, it was *felt* that *possibly* the stitch may have altered the anatomy or crowded the takeoff of the circumflex artery despite the fact that the patient had normal PA pressures and no ST segment changes.

(Jt. Ex. 4:004 (emphasis added).) That Dr. Pratt stated in his operative report that the circumflex artery may possibly have been kinked during the second repair attempt does not establish that his theory was true.[27] The facts of the case indicate otherwise.

First, the pathologist concluded, prior to cutting off the left main artery, that it was unremarkable. (Tr. 1214:3–1215:1 (Dr. Jamieson discussing pathologist's report).) Second, examination of the button at the experts' November 17, 2014 inspection did not reveal any narrowing of the button. (Tr. 1211:3–7, 1214:3–1215:1.) Third, and significantly, Dr. Jamieson testified that any kinking, narrowing, or obstruction of the circumflex artery would have affected both the lateral wall and inferior wall of Mr. Wright's heart. (Tr. 1096:16–1098:3, 1099:3–1102:15, 1214:14–17.) Even setting aside the pathologist's conclusion and the experts' examination results, the confinement of the hypokinesis and later myocardial infarction to the inferior wall of Mr. Wright's heart shows that the circumflex artery was not kinked or narrowed. Finally, Dr. Jamieson explained that the circumflex artery "is not a free structure," and that the circumflex

---

[27] Dr. Jamieson also testified that kinking of the left coronary artery button anastomosis is a "known complication" of a modified Bentall procedure, and that the fact of kinking does not necessarily mean that the surgeon breached the standard of care. (Tr. 1213:5–1214:02.) While a failure to properly align the button might indicate a breach of the standard of care, (*see id.*), the evidence shows that Dr. Pratt carefully aligned the button, (Tr. 727:9–23, 733:24–734:10).

artery and the left anterior descending artery are "often embedded in the heart"—while "the button and part of the left main" may be separated, it is not possible to "free the left anterior descending [artery] and the circumflex [artery]." (Tr. 1102:02–15.)

In light of the above, the Court concludes that Plaintiff has failed to carry her burden to prove that Dr. Pratt breached the standard of care by narrowing or kinking the left circumflex artery.

4. Bleeding

Dr. Shuman testified that Dr. Pratt breached the standard of care by "basically fail[ing] to stop the bleeding of th[e] patient." (Tr. 190:07–08.) To start, Plaintiff appears to have relegated the majority of her discussion of Mr. Wright's bleeding to the issue of causation. (Dkt. No. 93 at 17–18; Dkt. No. 97 at 8–9.) In addition, whether Dr. Pratt's failure to stop Mr. Wright's bleeding was a breach of the standard of care appears to depend largely on concluding that Dr. Pratt committed the other alleged breaches of the standard of care. In any event, Plaintiff has failed to carry her burden of proof with respect to this fourth claim.

The weight of the evidence indicates that Mr. Wright did not have uncontrolled surgical bleeding, but rather had a medical coagulopathy, and that Dr. Pratt properly treated Mr. Wright's bleeding disorder.[28] First, the doctors and experts in this case agree

---

[28] Dr. Shuman acknowledged that "sometimes it's hard to separate surgical bleeding from medical bleeding," (Tr. 278:09–15), which is evident in how his testimony often conflates the two without explaining the basis of his opinion that there was uncontrolled surgical bleeding (*see, e.g.*, Tr. 278:09–11 ("So sometimes it's hard to separate surgical bleeding from medical bleeding, but if the surgical bleeding isn't corrected, it results in medical bleeding. And you had both."), Tr. 270:09–12 (stating that Mr. Wright's estimated blood loss was "surgical and medical bleeding"), Tr. 293:04–05 ("[T]here clearly was excessive bleeding even in the operating room when they tried to do the bypass and did do the bypass. The perfusionist had to add ten units of blood to the pump in order to get adequate flows to the heart-lung machine. So clearly, surgical bleeding in addition to medical bleeding was going on[.]"), Tr. 355:04–07 ("[W]hen you look at the horrendous bleeding that occurred intraoperatively and post-operatively, there had to have been an area of surgical bleeding that we could not identify at autopsy.")). In any event, it appears that the distinction between the two was not material to Dr. Shuman's opinion. Dr. Shuman testified that regardless of whether it was surgical or medical bleeding, Dr. Pratt had the

that bleeding is a major risk of heart surgery and not necessarily indicative of malpractice. (Tr. 874:15–18, 1089:17–1090:1, 192:4–5, 1221:17–21, 1046:01–05, 1044:20–21, 1140:22–1141:04 , 1224:21–25, 1037:25–1038:5.)

Second, Dr. Pratt and Dr. Ramirez both examined Mr. Wright's open chest in the operating room and did not observe surgical bleeding at either the proximal suture line or the left coronary artery button. (Tr. 1062:13–19, 803:7–16.) Dr. Cornelissen corroborated their testimony. (Tr. 877:2–23.) Dr. Pratt and Dr. Ramirez observed Mr. Wright's open chest for an extended period of time, and Dr. Pratt repeatedly tested the proximal suture line and left coronary artery button sites for bleeding in the ICU as well. (Tr. 759:25–763:14, 812:9–813:7, 817:22–818:13.) The attending doctors did not detect surgical bleeding at the proximal suture line at any point in time, and did not detect any further surgical bleeding from the left coronary artery button after Dr. Pratt's second repair. (Tr. 877:7–23, 1051:10–13, 1062:13–19, 764:24–765:4, 812:19–22, 842:8–10, 949:21–950:5; *see also* Tr. 1117:24–1118:04 (Dr. Jamieson's testimony that the attending surgeon makes the decision as to whether there is bleeding at an anastomotic site).) Instead, laboratory coagulation studies showed that Mr. Wright had a medical coagulopathy in the ICU. (Tr. 839:16–842:10.)

Third, the weight of the evidence shows that Dr. Pratt properly monitored Mr. Wright in the ICU and appropriately chose not to return Mr. Wright to the operating room. Dr. Shuman asserted that the Kirklin formula applied to Mr. Wright's case. Specifically, Dr. Shuman testified that chest tube outputs exceeding 300 cc per hour after heart surgery require a surgeon to return the patient to the operating room in order to reexamine the wound. (Tr. 274:17–276:25.) However, Dr. Shuman was unable to produce a reference at trial to support his assertion that outputs exceeding 300 cc per hour

---

obligation to return Mr. Wright to the operating room once a certain threshold of blood volume loss was reached. (Tr. 278:12–21.)

require a patient to be returned to the operating room.[29] (Tr. 276:18–24.) Even if Dr. Shuman had produced such a reference at trial, Dr. Jamieson and Dr. Serio both testified that Dr. Shuman's reference did not apply to Mr. Wright's situation. (Tr. 973:9–974:5, 1116:24–1117:23.) Dr. Serio testified that the studies underlying Dr. Shuman's position were based upon patients who left the operating room with closed chests and who had undergone "relatively routine procedures." (Tr. 973:9–974:5.) Dr. Jamieson similarly testified that the reference would apply to "straightforward" cases with short bypass runs and less cross-clamp time. (Tr. 1116:24–1117:23.) He further testified that even in a straightforward case, chest tube outputs exceeding 500 cc an hour would not warrant taking the patient back to the operating room right away, but would rather "warrant observation." (*Id.*) In contrast, patients like Mr. Wright, whose chest was not closed and who had undergone three rounds of bypass, present "a completely different scenario," rendering Dr. Shuman's reference inapplicable. (*Id.*) Finally, transporting Mr. Wright back to the operating room from the ICU would have entailed unnecessary risks. (Tr. 811:10–812:8, 820:7–13, 1118:6–1119:11, 946:19–948:11.)

Dr. Jamieson testified that Dr. Pratt's attempts to control Mr. Wright's bleeding met the standard of care. (Tr. 1156:02–04.) Dr. Kenneth Serio agreed with Dr. Jamieson's assessment. (Tr. 954:10–955:20.) Dr. Pratt monitored Mr. Wright and treated Mr. Wright's medical coagulopathy with packed red blood cells, fresh frozen plasma, platelets, and cryoprecipitate. (Tr. 954:10–17, 955:16–20.)

---

[29] After subtracting an estimated 1,000 cc of saline irrigation fluid, Dr. Serio estimated that Mr. Wright lost approximately 512 cc per hour of bloody fluid from the chest tubes draining the area of his heart and approximately 121 cc per hour of bloody fluid from the area around his right lung while in the ICU. (Tr. 943:6–17.) Plaintiff's estimate is double Dr. Serio's estimate. (Dkt. No. 93 at 5–6.) The dispute over whether an estimated 1,000 cc of saline irrigation fluid should be subtracted from the volume of fluid loss is immaterial for two reasons. First, the Court finds unsubstantiated Dr. Shuman's assertion that any loss of over 200 to 300 cc per hour requires returning a patient to the operating room. Second, both parties' estimates exceed 200 to 300 cc per hour.

Plaintiff has failed to prove by the preponderance of the evidence that Dr. Pratt breached the standard of care with respect to this claim.

5. Timing of CABG Procedure

Dr. Shuman opined that Dr. Pratt breached the standard of care by delaying the CABG procedure by three hours. (Tr. 190:04–12.) Plaintiff has failed to carry her burden of proof with respect to this claim.

First, Mr. Wright's heart function appeared to improve during the period of observation following the insertion of the intra-aortic balloon pump. Dr. Cornelissen, Dr. Ramirez, and Dr. Pratt testified that the strength and contractility of Mr. Wright's left ventricle improved. (Tr. 889:9–15, 795:4–7, 1056:13–1057:2,1058:6–22.) Mr. Wright's pulmonary artery pressures were stable; they would have been far more elevated had the heart been tiring over time or failing to respond to treatment. (Tr. 873:14–874:7, 1055:3.) Mr. Wright's EKG showed no evidence of ST segment changes and accordingly no evidence of ischemia. (Tr. 1132:09–13, 870:10–13, 783:10–22,1054:24–1055:3.) Mr. Wright's cardiac output improved from 4.2 to 5.3, a normal cardiac output for a man of Mr. Wright's age, and remained at 5.3 between 5:38 p.m. and 5:53 p.m. (Jt. Ex. 2:014, 2:017; Tr. 1132:14–18, 869:2–870:9, 794:11–20, 799:16–19, 342:13–16.) Dr. Jamieson testified that while the IABP, medications, and blood and fluid products assist the heart,[30] the cardiac output is ultimately generated by the heart, as cardiac output cannot be improved merely on the basis of fluids and drugs. (Tr. 1132:19–1133:16.) Accordingly, Mr. Wright's improving cardiac output indicated that Mr. Wright's heart was actually improving. (*Id.*; *see also* Tr. 1058:6–22, 872:19–22, 1120:15–25 (Dr. Jamieson's testimony that Mr. Wright's "cardiac output went up and his numbers looked good").) Indeed, Dr. Hiserodt agreed that one would not expect improving cardiac outputs in a

[30] Dr. Jamieson also testified that "very frequently, more often than not, we will use inotropic drug[s]—that is, drugs to help the myocardium recover—which we will keep on, often for several days, until the heart . . . recovers" after being on bypass for surgery. (Tr. 1140:03–10.)

person undergoing a myocardial infarction. (Tr. 542:10–19; *see also* 1055:16–24 (Dr. Ramirez's corroborating testimony). Given the above, and the need to allow hearts to recover from extended periods of time on bypass, Dr. Jamieson testified that Dr. Pratt appropriately weighed the risks of a CABG procedure, which requires further time on bypass and anticoagulation, in light of Mr. Wright's improving cardiac status. (Tr. 1119: 17–1120:25, 1218:15–20, 1134:21–1135:03, 1139:25–1140:8, 795:8–11.) Dr. Jamieson testified that for a patient like Mr. Wright, who had been ischemic and on bypass for a long time, "the indication would have to be very strong to want to go back for a third period on bypass and a third period without any blood supply." (Tr. 1120:2–12; *see also* Tr. 1134:18–1135:3, 1201:7–11.)

Moreover, Mr. Wright's hypokinesis was localized to a portion of his inferior wall, indicating that the circumflex artery had not been kinked or narrowed. *See supra* Part 3.b. Had the inferior and the lateral walls both been affected by compromised flow from the circumflex artery, a bypass would have been indicated. (Tr. 790:14–20, 792:8–11, 1071:24–1072:7.) There was no hypokinesis in Mr. Wright's lateral wall. (Tr. 791:7–8.)

Dr. Pratt appropriately decided to proceed with a CABG procedure when Mr. Wright began to require increased dosages of medication and inotropic support to support his dropping blood pressure at approximately 6:00 p.m. (Jt. Ex. 4:004; Tr. 797:13–800:9.) Dr. Pratt and his team expeditiously carried out the procedure by placing Mr. Wright back on bypass between 6:46 p.m. and 9:05 p.m., harvesting a vein from Mr. Wright's leg, and performing two coronary artery bypass grafts. (Tr. 868:1–3; Jt. Ex. 4:004–005; Jt. Ex. 2:016, 2:019.)

Dr. Jamieson testified that Dr. Pratt met the standard of care in his observation of Mr. Wright in the operating room and in his determination of the timing for performing the CABG procedure. (Tr. 1156:5–20, 1119:17–1121:18.) The weight of the evidence does not indicate that Dr. Pratt breached the standard of care with respect to the timing of the CABG procedure. Plaintiff has not carried her burden of proof with respect to this claim.

6. LVAD

Dr. Shuman testified that Dr. Pratt and his surgical team breached the standard of care by failing to insert a left ventricular assistive device ("LVAD") while Mr. Wright was still in the operating room. Given that Mr. Wright was not stable enough to be transported to another hospital, Dr. Shuman opined that Dr. Pratt should have called Dr. Jamieson's group at UCSD or Dr. Dembitsky's group at Sharp to come and insert an LVAD in Mr. Wright. Dr. Shuman testified that in San Diego, Dr. Jamieson's and Dr. Dembitsky's groups are the only two teams who can come and place an LVAD in a patient.

At trial, Dr. Shuman testified that Mr. Wright would have had a greater than 50% chance of survival had an LVAD been placed. (Tr. 259:08–11.) However, Dr. Shuman was impeached with his deposition testimony, wherein he opined that Mr. Wright had only a "50/50" chance of survival with an LVAD. (Tr. 259:12–260:20.) A 50% chance of survival does not meet the legal threshold for medical malpractice. *See Bromme v. Pavitt*, 5 Cal. App. 4th 1487, 1504–05 (Cal. Ct. App. 1992) ("California does not recognize a cause of action for wrongful death based on medical negligence where the decedent did not have a greater than 50 percent chance of survival had the defendant properly diagnosed and treated the condition."); *Dumas v. Cooney*, 235 Cal. App. 3d 1593, 1603–08 (Cal. Ct. App. 1991) (rejecting lost chance of survival theory when the chance of survival is less than 50%); *see also Jones*, 163 Cal. App. 3d at 403; *Morgenroth*, 54 Cal. App. 3d at 533–34; *Miranda*, 187 Cal. App. 4th at 1336; *Mayes*, 139 Cal. App. 4th at 1093.

At the end of Plaintiff's case in chief, the United States moved for judgment as a matter of law on this alleged sixth breach of the standard of care.[31] (Tr. 692:1–693:7.) In response, Plaintiff's counsel effectively conceded this issue, stating, "With regard to Item

[31] The Court took the matter under submission. (Tr. 693:25–694:02.)

Number 6 . . . [w]e would submit that that might be the case." (Tr; 693:05–07.) Plaintiff appears to have subsequently abandoned her claim, making no reference to the issue in her closing arguments.

Finally, even setting aside Dr. Shuman's problematic testimony, it is clear that Dr. Pratt and his surgical team did not breach the standard of care by failing to insert an LVAD while Mr. Wright was still in the operating room. Dr. Jamieson discussed how an LVAD was simply not an option for Mr. Wright. There are "stringent criteria" for use of an LVAD that were not "clinically indicated" in Mr. Wright's case. (Tr. 1135:22–1136:14.) Insertion of an LVAD requires the administration of Heparin to a patient; given Mr. Wright's medical coagulopathy, insertion of an LVAD was "out of the question." (*Id.*) Moreover, Dr. Jamieson testified that neither he nor his team could simply go to another hospital and perform surgery without first obtaining privileges, a process that could not be accomplished in the middle of the night. Dr. Jamieson testified that while he occasionally manages to obtain emergency privileges for other doctors at UCSD, even the emergency process takes about a week.

Dr. Pratt and his surgical team did not breach the standard of care by failing to insert an LVAD while Mr. Wright was still in the operating room.

CONCLUSION

The Court finds that Plaintiff failed to meet her burden of proof by a preponderance of the evidence and orders judgment in favor of Defendant United States of America.

IT IS SO ORDERED.

Dated: July 14, 2017

Hon. Gonzalo P. Curiel
United States District Judge