INTO THE MAGIC SHOP
A NEUROSURGEON’S QUEST TO DISCOVER THE MYSTERIES OF THE BRAIN AND THE SECRETS OF THE HEART

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Introduction: Beautiful Things

There’s a certain sound the scalp makes when it’s being ripped off of a skull – like a large piece of Velcro tearing away from its source. The sound is loud and angry and just a little bit sad. In medical school they don’t have a class that teaches you the sounds and smells of brain surgery. They should. The drone of the heavy drill as it bores through the skull. The bone saw that fills the operating room with the smell of summer sawdust as it carves a line connecting the burr holes made from the drill. The reluctant popping sound the skull makes as it is lifted away from the brain. The scissors slowly slicing open the dura—the thick sac that covers the brain and serves as its last line of defense against the outside world. When the brain is exposed you can see it move in rhythm with every heartbeat, and sometimes it seems that you can hear it moan in protest at its own nakedness and vulnerability—its secrets exposed for all to see under the harsh lights of the operating room.

The boy looks small in the hospital gown, and is almost swallowed up by the bed as he’s waiting to enter surgery.

“My nana prayed for me. And she prayed for you too.”

I hear the boy’s mother inhale and exhale loudly at this information, and I know she’s trying to be brave for her son. For herself. Maybe even for me. I run my hand through his long hair. It is brown and long and fine—still more baby than boy. He tells me he just had a birthday. It reminds of my own child who will also be turning five next week.

“Do you want me to explain again what’s going to happen today, Champ, or are you ready?” He likes it when I call him Champ or Buddy.

“I’m going to sleep. You’re going to take the Ugly Thing out of my head so it doesn’t hurt anymore. Then I see my mommy and nana.”
The “Ugly Thing” is a medulloblastoma, the most common malignant brain tumor in children and is located in the posterior fossa. Medulloblastoma isn’t an easy word for an adult to pronounce, much less a 4-year-old, no matter how precocious. Pediatric brain tumors really are ugly things so I’m okay with the term. Medulloblastoma are misshapen and often grotesque invaders in the exquisite symmetry of the brain. They begin between the two lobes of the cerebellum and progressively grow, ultimately compressing not only the cerebellum, but also the brainstem, until finally blocking the pathway that allows the fluid in the brain to circulate. The brain is one of the most beautiful things I have ever seen and to explore its mysteries and find ways to heal it is a privilege I have never taken for granted.

“You sound ready to me. I’m going to put on my superhero mask and I’ll meet you in the bright room.”

He smiles up at me. Surgical masks and operating rooms scare him—but superhero masks and bright rooms do not. The mind is a funny thing, but I’m not about to explain semantics to a 4-year-old. Some of the wisest patients and people I have ever met have been children. I turn to his mother and grandmother. “Someone from the team will update you as we progress. I anticipate it will be a complete resection. I don’t expect any complications.” This isn’t just surgeonspeak to tell them what they want to hear—my plan is for a clean and efficient surgery to remove the entire tumor, while sending a small slice to the lab to see just how ugly this Ugly Thing is.

I know both mom and grandma are scared. I hold each of their hands in turn, trying to reassure them and offer comfort. It’s never easy. A little boy’s morning headaches have become every parent’s worst nightmare. Mom trusts me. Grandma trusts God. I trust my team.

Together we are a team, and today we will try to save this boy’s life.

After the anesthesiologist counts him down to sleep, I place his head in a head frame attached to his skull and then position him prone. I get out the hair clippers. Although the nurse usually preps the surgery sight, I prefer to shave his head myself, but I cut off some of the length first and give it to the tech to put in a small bag for the boy’s mother. This is his first haircut, and while it’s the last thing on his mom’s mind now, I know it will matter to her later. It’s a milestone you want to remember. First haircut. First tooth lost. First day of school. First time riding a bike. First brain surgery is never on this list.

I gently cut away the fine light brown strands hoping my young patient is able experience each of these firsts. In my mind I can see him smiling with a large gap where his front teeth should be. I see him walking into kindergarten with a backpack that’s almost as big as he is slung over one shoulder. I see him riding a bike for the first time—that first thrill of freedom, peddling feverishly with the wind in his hair. I think of my own child as I continue to clip his hair. The images and scenes of all his firsts are so clear in my mind that I can’t imagine any other outcome. I don’t want to see a future of hospital visits and cancer treatments and additional surgeries. As a survivor of a childhood brain tumor, he will always have to be monitored, but I refuse to see him in the future as he’s been in the past. The nausea and vomiting. The falling down. The waking in the early morning hours screaming for his mother because the Ugly Thing is
compressing his brain and it hurts. There’s enough heartbreak in life without adding this to the mix. I continue to gently clip his hair just enough so I can do my work. I make two dots at the base of his skull where we will make our incision and draw a straight line.

Brain surgery is difficult, surgery in the posterior fossa more so and in a small child very difficult. This tumor is large and the work painstakingly slow and precise. Eyes looking through a microscope for hours focused on one thing. As surgeons we are trained to shut down our own bodily responses as we operate. We don’t take bathroom breaks. We don’t eat. If our back aches and our muscles cramp, we don’t feel it. I remember my first time in the operating room assisting a renowned surgeon who was not only known for being brilliant, but also for being a belligerent prick when he operated. I was intimidated and nervous, and as I stood next to him in the operating room sweat began pouring down my face. I was breathing heavily into my mask and my eyeglasses began steaming up. I couldn’t see the instruments or even the operating field. I had worked so hard, overcome so much, and now here I was, a surgeon just like I had always imagined, but I couldn’t see a thing. Then the unthinkable happened. A large drop of sweat rolled off my face and into the sterile field. He went ballistic. It should have been a highlight, my first time in the operating room, but instead I contaminated the entire surgery and was summarily kicked out of the operating room.

Today my forehead is cool and my eyesight clear. My pulse is slow and steady. Experience makes the difference, and in my operating room I am not the dictator. Or a belligerent prick. Every member of the team is valuable and necessary. Everyone is focused on his or her part. The anesthesiologist monitors the boy’s blood pressure and oxygen, his level of consciousness, and the rhythm of his beating heart. The surgical nurse constantly monitors the instruments and supplies, making sure whatever I need is within reach. A large bag is attached to the drapes and hangs below the boy’s head collecting blood and irrigation fluid. The bag is attached to a tube connected to a large suction machine and constantly measures the fluids so we know how much blood loss we have at any given moment.

The surgeon assisting me is a senior resident in training and new to the team, but he is just as focused on the blood vessels, and brain tissue, and minutiae of removing this tumor as I am. We can’t think about our plans for the next day, or hospital politics, or our children, or our relationship trouble at home. It’s a form of hyper-vigilance, a single-pointed concentration almost like meditation. We train the mind and the mind trains the body. There’s a rhythm and a flow and when you have a good team everyone is in sync. Our minds and bodies work together as one coordinated intelligence.

I am removing the last piece of the tumor, which is attached to one of the major draining veins deep in the brain. The posterior fossa venous system is incredibly complex, and my assistant is suctioning fluids as I carefully resect the final remnant of tumor, which is attached to one of the large draining veins. He lets his attention wander for a second and in that second his suction tears the vein, and everything stops for the briefest moment.

Then all hell breaks loose.

The blood from the ripped vein has filled the resection cavity in that split second and blood is overflowing out of the wound of this beautiful little boy’s head. The anesthesiologist starts yelling that the child’s blood pressure is rapidly dropping, and he can’t keep up with the blood loss. I need to clamp the vein and stop the
bleeding, but it has retracted into a pool of blood and I can’t see it. My suction alone can’t control the bleeding and my assistant’s hand is shaking too much to be of any help.

“He’s in full arrest!” the anesthesiologist screams as he scrambles under the table. He has to go under the table since this little boy’s head is locked in a headframe, prone, with the back of his head opened up. He starts compressing on the front of the boy’s chest while holding his other hand on his back, trying desperately to his get his heart to start pumping. Fluids are being poured into the large IV lines. The heart’s first and most important job is to pump blood, and this magical pump that makes everything in the body possible has stopped. This precious four-year-old boy is bleeding to death on the table in front of me. As the anesthesiologist pumps on his chest the wound continues to fill with blood. We have to stop the bleeding or he will die. The brain consumes 15% of the outflow of the heart and can only survive minutes after the heart stops. It needs blood and more importantly, the oxygen that is in the blood. We are running out of time before the brain dies—they need each other—the brain and the heart.

I am frantically trying to clamp the vein, but there’s no way to see the vessel to get the clip on. Although his head is clamped into position, the chest compressions are moving it ever so much and the drapes covering his body. They know like I know that we are running out of time. The anesthesiologist looks up at me and I see the fear in his eyes…we might lose this child. CPR is like trying to clutch start a car in second gear—it’s not very reliable. I am working blind, so I open my heart to a possibility beyond reason, beyond skill, and I begin to do what I was taught decades ago, not in residency, not in medical school, but in the back room of a small magic shop in the California desert.

I calm my mind.

I relax my body.

I visualize the retracted vessel. I see it in my mind’s eye, folded into this young boy’s neurovascular highway. I reach in blindly but knowing that there is more to this life than we can possibly see—and that each of us is capable of doing amazing things far beyond what we think is possible. We control our own fates, and I don’t accept that this 4-year-old is destined to die today on the operating table.

I reach down into the pool of blood with the open clip, close it, and slowly pull my hand away.

The bleeding stops, and then as if far away, I hear the slow blip of the heart monitor. It’s faint at first. Uneven. But soon gets stronger and steadier as all hearts do when they begin to come to life.

I feel my own heartbeat begin to match the rhythm on the monitor. Later in post-op I will give his mother the remnants from his first haircut, and my little buddy will come out of the anesthetic a survivor. He will be completely normal. In 48 hours, he will be talking and even laughing, and I will be able to tell him that the Ugly Thing is gone.