

Shalika Padhi

Mr. Speice

Independent Study and Mentorship 4B

26 January 2018

Original Work Assessment

The original work conducted was primarily concerned with creating a treatment plan for pediatric gliomas and the subtypes of gliomas in children. The treatment plan was a close analysis of the best forms of treatment for each type of tumor based on the location, size, and urgency of operation for the tumor

Objective

The objective of the original work was to minimize the malpractice of pediatric brain tumors with the creation of a treatment plan in reader friendly language to allow parents of patients to understand the implications, repercussions, and method of surgery. Neurosurgery requires careful analysis of the brain which is one of the most complex structures, however, with that come the repercussions of Neurosurgery being one of the most malpractices fields of medicine with a one in five rate of malpractice. The purpose of this original work was to create both an original treatment plan assessing different types of gliomas and analyzing treatment plans to pair up the treatment options with the glioma based on symptoms, location, size, and the viability of the tumor to be resected. The visual aid also provides patients and their families with an idea of where the tumor is, what areas it obstructs, and what can be done to treat the tumor. With this, the primary goal was to minimize malpractice by making patient and patient families more aware of the treatment their child is going through.

Materials

Materials used for the meta-analysis of this research were primarily a combination of multiple research papers on databases such as the National Institutes of Health (NIH), Cancer organizations, and OncoLink. The sources provided information on the different aspects of the research including the rate of malpractice, the types of gliomas, different treatment types, symptoms, and what area each tumor affected. This allowed for the combination of sources into a well analyzed paper that drew correlations from multiple case studies on high grade and low grade gliomas. The visual aid was made using clay and a styrofoam head to make the base of the brain. The fake blood was made using corn syrup, chocolate syrup and red food coloring to give the brain the illusion of being in surgery.

People Involved

The people involved were primarily my mentor, Dr. Bruno Braga, who helped in brainstorming ideas as part of the initial process. Due to the difficulty in obtaining a mentor, it was not an option to acquire research or scans by the doctor specifically. However, Dr. Namrata Das, a UTD PhD student professor, who helped throughout the process in terms of understanding confusing content. Throughout the research, there were numerous articles that were comprehensive and difficult to interpret due to the complexity of the data. She essentially helped break down articles and provided sources to get the most accurate information.

Description of Process

The process of making the treatment plan was a comprehensive compilation of research on three main factors including brain tumor malpractice, pediatric high grade and low grade gliomas, and treatment types. The process started with research on whether medical malpractice

exists specifically in brain tumors. Research showed that a lot of tumors are misdiagnosed, however, there seems to be an increase in the number of brain tumors. In reality, these tumor cases haven't increased, but rather technological advancements has allowed for more accurate diagnosis of tumors. The research progressed into reading detailed articles on pediatric gliomas including the symptoms, types, and primary locations of the brain tumors. The research showed three main types of treatment including radiation therapy, chemotherapy, and surgery. From there, correlations were drawn between the types of tumors and their locations in relation to the best form of treatment for that specific tumor. For example, optic pathway gliomas obstruct the optic nerves and resecting a tumor in that area could result in blindness. For this reason, the best treatment option seemed to be chemotherapy and low intensity forms of radiation therapy such as proton radiotherapy. The combination of all the research was broken down into three main components looking at low grade astrocytomas, ependymomas, and glioblastoma multiformes. The treatment plan essentially progresses from low grade to high grade tumors or less severe cases to more severe cases.

The second portion of the original work was the visual prototype which was construed of the visual brain model. The process in making this was strenuous due to the difficulty in keeping clay from both drying and cracking. A styrofoam head was used in which the skull was cut off and layered with a base of clay. The clay was then rolled and draped across the base of the skull to resemble the sulci and the gyri which are essentially the bumps or indents in the brain. The drying process took around two days in order for the brain to be painted with fake blood made with corn syrup, red food coloring, and chocolate syrup. The final portion was to add the inside of the brain and the tumors. The tumors were two low grade astrocytomas, an optic pathway

glioma, and a glioblastoma multiforme. All the tumors were placed in the most common area for them to occur. However, every body is different, so the model could not be an exact replica of the brain tumors due to variance in the location of different tumors.

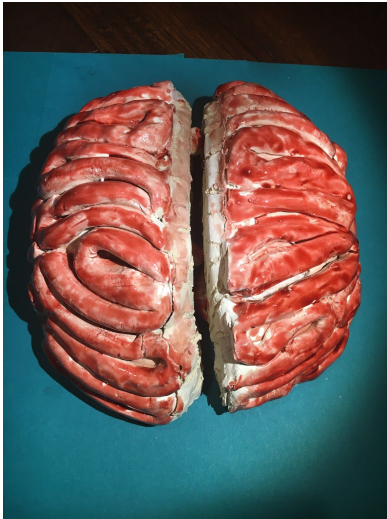


Figure 1 depicts the brain structure made out of clay to indicate the sulci and gyri on the brain.

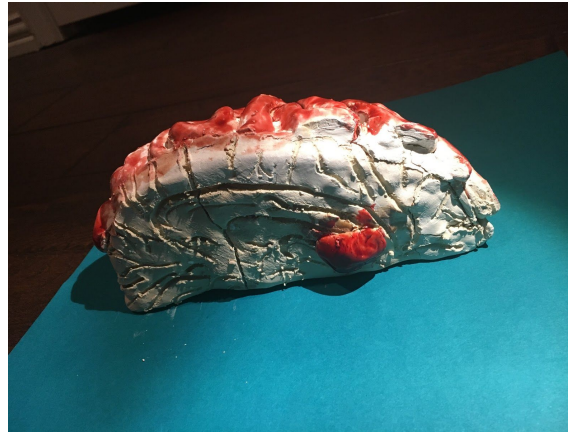


Figure 2 indicates a glioblastoma multiforme in the infratentorial brain. This specific tumor is one of the deadliest which provides patients with a few months to live.

Utilization of Higher Level Thinking Skills

Original work process was largely extensive and synthesized an immense amount of complex research. The research was immensely comprehensive due to the detail of all the research papers. The whole research process was difficult to do due to the complexity of papers that had to be both read and analyzed in order to draw conclusions and correlations between the research. Papers constantly had medical jargon that was difficult to understand and comprehend and be able to apply to the treatment plan. In the process of making the treatment plan, not only did I have to understand the research papers, but also synthesize them in order to correlate each

tumor type with the treatment type. Understanding the basics of gliomas was in itself highly difficult due to the complexity of how a tumor works, what causes it, and the reason certain treatments are more viable than others. Understanding the statistical data in the research papers was also immensely difficult to understand because the numbers had complex units which had to be interpreted and incorporated into the data for the actual treatment plan. Synthesizing required both the understanding of the data as well as being able to correlate different treatment process with the type of tumor. This entailed that I had to have an understanding of the treatment and how it is conducted in order to compile the data into a cohesive treatment plan.

The model portion of the brain also required the synthesis and analysis of data in order to be able to replicate a brain model without any sort of inline reference. The brain model references were not clear or available online so it required a careful synthesis on the structures of the brain in order to understand how to make the sculpture an accurate representation of a brain. The study also required a careful analysis of the different lobes of the brain in order to know exactly where each tumor is located on the brain. The location also showed exactly what areas of the brain are affected by each type of tumor either high grade or low grade. Locating tumors in order to replicate the brain as accurately as possible was a difficult task to accomplish.

Results

The results of the research indicated the best treatment options for each type of tumor. For low grade astrocytomas such as Juvenile Pilocytic Astrocytoma (JPA) the best form of treatment would be resection due to the low grade nature of the tumor. The slow slow division of such tumors and the general location of where they arise allows them to be surgically removed. Glioblastoma multiformes are a much more fatal and severe tumor in addition to their location

being in areas that are vital to the body which makes them generally harder to remove from the brain. The treatment option based suited for these tumors is radiation therapy or proton therapy in addition to chemotherapy. The ependymomas showed evidence of being treated best with surgery and followed up with radiation therapy. In order to provide more accuracy, the best form of surgery could include intraoperative MRI. The results showed mainly the treatment types for each specific type of tumor.

Conclusion

The topic showed the diversity in treatment option available to treat pediatric brain tumors and how to counteract different types of tumors based on clinical symptoms. The research allowed to put into perspective how surgeons conduct surgery and how to provide patients with best quality care. The whole process is comprehensive and requires multiple steps. The ultimate goal in doing this was to make sure that patients are aware of the implications of treatment. This research is significant because it provides a way to possibly minimize malpractice and make sure parents are bringing their children to the doctors if they see any symptoms of brain tumors. The purpose is essentially to make the process of treatment more inclusive of the family as a whole rather than just the doctor. In order for a patient to be effectively treated, the family must know what is going on and how the patient will develop and change over time. This will minimize the number of deaths caused by tumors and the lack of diagnosis for tumors. Patients should be aware of their symptoms and how to counteract them. For my personal topic, this brings in an abundance of research that will be helpful in my understanding of surgeries than I can watch later on in the mentorship. This will make the

process of learning and understanding much easier in addition to making it easier to be able to apply the research to the final product.

The ultimate purpose of this research was to minimize the malpractice rate and make treatment inclusive by providing the best quality care to patients. The goal of all medicine is to provide the best care to all patients and this treatment plan may be the first step towards starting that.