Thoracic Epidural Impact on Postoperative Pain Control in Lung Transplant Patients

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1 Background

Over 1,000 lung transplants occur across the United States every year. Johns Hopkins Hospital (JHH) performs at least 20 of these lung transplants yearly, making it a high volume center for lung transplants. JHH's high lung transplant volume makes it the hospital with best overall patient survival rates and limited number of deaths. However, successful lung transplants greatly depend on effective pain management to ensure sufficient graft expansion, respiratory effort, and patient quality of recovery (QOR) (Shah & Weiss, 2009).

The Department of Anesthesiology and Critical Care Medicine at JHH has a vision to develop ground breaking research in pain management as well as the need for effective pain management in lung transplant patients (Johns Hopkins Medicine, 2013). This vision was the main driving force behind "Thoracic Epidural Impact on Postoperative Pain Control in Lung Transplant Patients". This research study was a collaborative effort between Dr. Marie Hanna, Lea Faraone, Dr. Molly Cason, Dr. Ami Naik, and David Hanna. This research project seeks to examine the efficiency of thoracic epidural analgesia (TEA) on postoperative lung transplant patients in providing both adequate pain control with no added morbidity and examining the safety of placement in this population.

For that reason, this research project is extremely important to healthcare, due to the fact that pain is an aspect of care we are constantly trying to manage. The project is also important to the Department of Anesthesiology and Critical Care Medicine at JHH, because it can help develop the best method for managing transplant pain. Along with making JHH a leader in research on TEA pain management for lung transplant patients, due to the lack of research currently performed on the subject matter.

2 Methods

Through an extensive retrospective study, we reviewed patient's charts presenting to JHH for lung transplantation between January 2008 and June 2013, after IRB approval was granted. The following information was gathered from lung transplant patient charts:

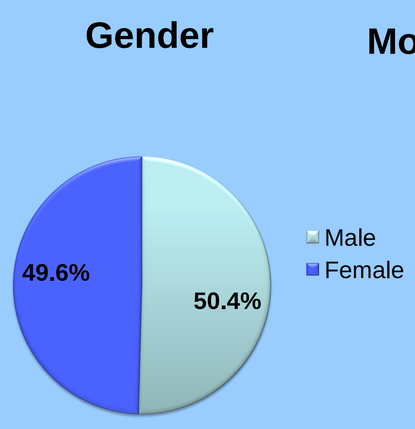
- **Patient Demographics**
- **Epidural and Pain Details:**
  - Opioid use prior to hospitalization
  - Epidural level of placement
  - Epidural placement and removal dates
  - Epidural days
  - Level of Sedation for placement
  - Epidural complications
  - Post epidural pain regimen
- **Visual Analog Scale (VAS) and QOR scores:** were collected on days 1, 3, 7, 10 & 21 after epidural placement.
- **Hospital Course:**
  - ICU days
  - Ventilation days
  - Reintubation date
  - Tracheostomy placement
  - In hospital morbidity and mortality
  - Duration of hospitalization
- **Bleeding/ Infection Risk**
  - Epidural anticoagulation placement and removal
  - Most intensive epidural anticoagulation regimen
  - Lowest platelet and white blood cell (WBC) count

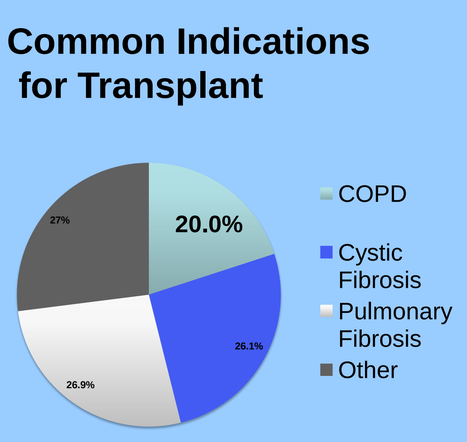
An analysis of the information gathered was then performed.

3 Results

123 patients received lung transplantation during the study period of January 2008 to June 2013. 4 of the 123 patients were excluded from the overall analysis due to the fact that epidurals were not a part of their postoperative pain management regimen. Study participants ranged from 18-73 years, with a mean age of 49 years.

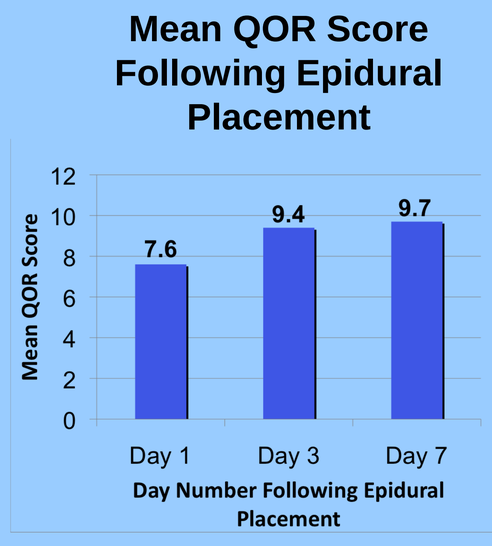
Patient Demographics

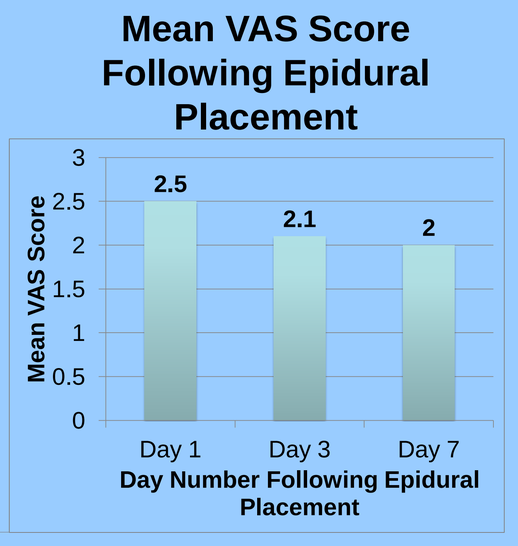




Of the 119 study participants there was a fairly even split between male and female participants. There was also a fairly even four way divide between COPD, cystic fibrosis, pulmonary fibrosis, and other for the most common indications of transplantation. The other indications for transplantation were an array of other conditions such as pneumonia, bronchiectasis, rheumatoid disease, mixed connective tissue disease, etc.

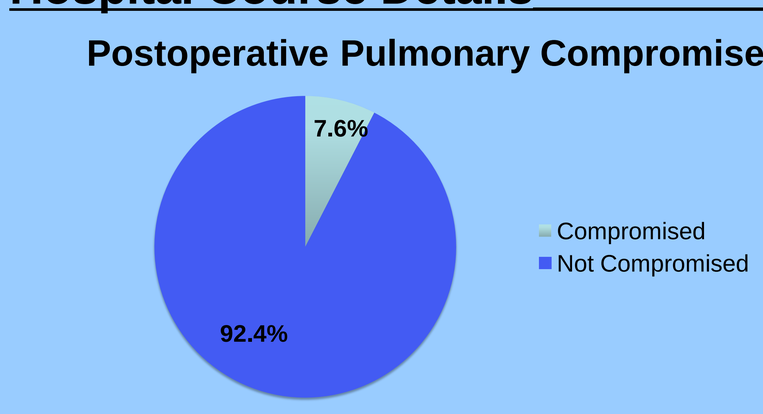
VAS & QOR Scores





The mean QOR scores gradually increased each day following epidural placement, which are illustrated in the first graph. The higher the QOR score indicates improvement in the patient's QOR. Meanwhile in the second graph, the patients' VAS scores gradually decreased each day following epidural placement. VAS scores measure a patient's pain level on scale from 0-10 (0 being no pain and 10 being extreme pain). The lower the VAS score indicates a lower pain level for the patient. Therefore, TEA increased QOR scores and decreased VAS scores, which indicates that TEA provided a better QOR and a lesser degree of pain for patients.

Hospital Course Details



The majority of patients did not have any form of postoperative pulmonary compromise following TEA. Since postoperative pulmonary compromise was minimal and no serious complications were associated following TEA placement postoperatively, it was proven to be a safe and effective method for managing lung transplant pain.

4 Conclusions

Based on the results that were gathered from study participants' QOR & VAS scores and hospital course details it is evident that TEA provides an outstanding analgesia method that offers a minimum of associated risks. This method not only improved QOR and VAS scores, but it also had minimal postoperative pulmonary compromise and no serious complications were associated with TEA.

Since pain control is an essential part of the recovery process following a lung transplant, TEA should be highly considered for patients appropriate for TEA placement after a lung transplant.

5 Study Limitations

- Half of the charts reviewed were electronic charts, while the other half of the charts reviewed were paper charts.
- The QOR and VAS scores were not actually conducted in person with each of the patients during their hospital stay. The scores were obtained during the study by reviewing both electronic and paper medical records.

6 Future Directions

- Perform another TEA study using current patients in the hospital to obtain VAS and QOR scores from the actual patient. This will demonstrate if obtaining QOR and VAS scores from medical records vs. obtaining these scores from the patient during the hospital stay had an impact on TEA results.
- Perform the TEA study on other types of transplant patients to identify if it is just as effective at managing their pain post transplant.
- Implement TEA in other hospitals performing lung transplants.
- Continue to use TEA in postoperative lung transplant patients at JHH.

7 References

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