

Risks and Benefits of Celecoxib Use during Surgery

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PICOT

Should Celecoxib be administered perioperatively to orthopedic surgical patients to decrease pain and inflammation with the risk of bleeding and delayed bone healing as opposed to not administering this drug?

Introduction

NSAID usage prior to surgery is often to be discontinued at least 5 half-lives before the day of surgery due to the potential for bleeding associated with the use of these drugs (Teerawattananon, Tantayakom, Suwanawiboon, & Katchamart, 2017). There is also a risk that these drugs will interfere with the healing process of some orthopedic sites, such as the rotator cuff (Oh, Seo, Lee, Choi, Joung, & Kim, 2018). However, some NSAIDs, such as Celecoxib otherwise termed Celebrex, have been proven effective to decrease pain and inflammation associated with surgery (Xu, Sang, Liu, Zhu, Lu, & Ma 2018). There are both risks and benefits in the perioperative administration of Celecoxib. One of the benefits of celecoxib specifically is that there are fewer GI side effects associated with this drug as opposed to other NSAID class drugs (Sinatra, 2002). There are differing views from healthcare professionals on the perioperative administration of this type of drug due to the risks associated with this drug class. Some healthcare professionals prescribe Celecoxib prior to surgery in order to decrease pain and inflammation for their patients, whereas other healthcare professionals feel that the risk of bleeding and poor healing outweighs the need to use this drug when there are other pain relieving drugs that can be used without the risk of bleeding and ineffective healing.

Description

I began my research by using the Cumulative Index of Nursing and Allied Health Literature (CINAHL) database to narrow down my findings. This was the only database I found

success with my specific topic. I initially searched for general findings related to the use of celecoxib and surgery. Key words such as “celecoxib,” “surgery,” “pain,” “healing,” and “bleeding” helped refine our searches. Some of the articles found evaluated the effects of celecoxib postoperatively, while others evaluated the use of this drug throughout the entire surgery process, and some articles discussed the use of this drug preoperatively. All of these research articles were included in my findings, as they all fall into the perioperative time period that is stated in my PICOT. Inclusion criteria of the research found included articles printed in the English language and that the articles had to look at celecoxib specifically and its relation to surgery. Exclusions included articles discussing specific surgeries that were not orthopedic.

Synthesis/Summary

The study conducted by Khan, Margarido, Devereaux, Clarke, McLellan, & Choi (2016) is a systematic review and meta-analysis of randomized control trials that investigates the effect that preoperative administration of celecoxib has on pain, along with the overall postoperative outcome of patients. The study found that the administration of celecoxib preoperatively improved pain level, decreased morphine consumption, and improved nausea and vomiting in postoperative patients. The study also found that there was not a correlation with the preoperative administration of celecoxib and intraoperative bleeding. A weakness of this study is that it examines all noncardiac surgery, as opposed to looking specifically at orthopedic procedures. Some of the strengths of this article is that it is concise and simple to interpret, it delves into the findings of random control trials and presents the information found in that study, and the research article presents an unbiased opinion, presenting all of the information found during the study along with the portions of the study that could have skewed the results.

The study conducted by Oh, Seo, Lee, Choi, Joung, & Kim (2018) presents information on the effect COX-2 inhibitors, such as celecoxib, have on pain and healing on those that have undergone a recent rotator cuff repair. The study randomly assigned different drugs to each participant. The three drugs that the study used were celecoxib, tramadol, and ibuprofen. Ibuprofen and celecoxib are both of the NSAID drug class, whereas tramadol is a light form opioid narcotic medication. The study found that celecoxib is an effective form of analgesia postoperatively, however those in the study that received celecoxib had an increased incidence of re-tearing their rotator cuff after using celecoxib as an analgesic, while those in the tramadol and ibuprofen groups did not have this occurrence. Overall, the study found that celecoxib inhibits tendon-to-bone healing after surgery. The strengths of this research article include that it is recent as it was conducted in 2018, it looks specifically at the effect celecoxib has on healing along with its analgesic effect, and that those who conducted this study used random assignment for which participants got which drug. A weakness of this study is that it only looked at those that had a rotator cuff repair instead of looking at general orthopedic procedures.

The Reuben, Ekman, Reuben, Scott, & Ekman study (2005) looks at the healing progression of a patient after the use of celecoxib as a mode of analgesia for a spinal fusion procedure. The study focused on patients that were given either celecoxib or a placebo pill, and these patients were then assessed for pain after their procedure, along with the intraoperative amount of bleeding and the progression of their healing one-year after the fusion procedure. The results of the study were that the postoperative pain after surgery with the administration of the celecoxib was significantly decreased as well the consumption of morphine during the post operation time period. The study also found that there was not a difference in the healing progression between the two groups and there was not an increased risk of bleeding during the

procedure. The strength of this research was that the study touched on both the risk of healing and bleeding. Some of the weaknesses include that the research was conducted in 2005 and the fact that the study looked only at spinal fusion procedures.

The systematic review and meta-analysis conducted by Teerawattananon, Tantayakom, Suwanawiboon, & Katchamart (2017) looks more into the bleeding risk that has been associated with celecoxib use. The study's findings were that there is not a significant correlation between the use of celecoxib throughout the surgical process and increased bleeding. The research looked into many studies conducted regarding bleeding and celecoxib use during surgery. The strengths of this study was that it presented unbiased information about the use of this drug with a surgical procedure. The study also delved into details about the studies assessed and discusses the many differences between each study, however this abundant description of detail makes it difficult to interpret the data presented.

The randomized control study by Xu, Sang, Liu, Zhu, Lu, & Ma (2018) looked into the effect celecoxib had on the inflammation of the operation site. The study used a group that was given both celecoxib and tramadol and a group the received tramadol only. The study assessed the temperature of the site along with other inflammatory markers such as white blood cell count, C-reactive protein, erythrocyte sedimentation rate, and interleukin-6. The study found that there was a significant decrease in the amount of inflammation present on the surgical site related to the use of celecoxib. The study was a randomized control trial, which does speak to the study's credibility. However, this study did not look at the risks associated with the use of celecoxib. The study also only assessed those that had had a total knee arthroplasty instead of general orthopedic surgeries.

Evaluation of Findings

Articles assessed throughout my research presented many consistencies, though are not devoid of inconsistencies. The studies done by Khan, Margarido, Devereaux, Clarke, McLellan, & Choi (2016), Teerawattananon, Tantayakom, Suwanawiboon, & Katchamart (2017), and Reuben, Ekman, Reuben, Scott, & Ekman (2005) all have evidence showing that the risk of bleeding associated with the celecoxib administration is minimal, if present at all; whereas, the studies conducted by Oh, Seo, Lee, Choi, Joung, & Kim (2018) and Xu, Sang, Liu, Zhu, Lu, & Ma (2018) do not assess for the bleeding risk related to the perioperative administration of celecoxib. All of the research articles discussed thus far all agree on the fact that celecoxib use does decrease pain during the perioperative period, and most of these studies also agree that the celecoxib use as a form of analgesia is effective. However, one article argues that the risk of ineffective healing related to celecoxib use is a valid reason to avoid celecoxib use as an analgesic (Oh, Seo, Lee, Choi, Joung, & Kim 2018). This result differs from the results found in the study conducted by Reuben, Ekman, Reuben, Scott, & Ekman (2005). In this study, the results show that the use of celecoxib did not delay the healing of the spinal fusion, which differs from the Oh, Seo, Lee, Choi, Joung, & Kim study (2018) results that show there is an altered tendon-to-bone healing process associated with the use of celecoxib.

Gaps in Literature

There were a few gaps present in the literature of the different research articles. Each article assessed a different attribute of celecoxib. One of the gaps in the research article written by Khan, Margarido, Devereaux, Clarke, McLellan, & Choi (2016) is that the studies analyzed during this review were primarily smaller trials. A gap present within the Oh, Seo, Lee, Choi, Joung, & Kim study (2018) was that of the 180 participants, 117 were female. This could create a third variable issue within the study. The meta-analysis conducted by Teerawattananon,

Tantayakom, Suwanawiboon, & Katchamart (2017) assessed many studies. The various studies had differing criteria and other factors. One of the ways this creates a gap is that the experimental interventions, such as the control group and the dosage of celecoxib, in each study differed, also potentially creating a third variable problem. One of the gaps present within the Xu, Sang, Liu, Zhu, Lu, & Ma study (2018) was that this study did not present a placebo pill in the control group. Instead the study presented only tramadol in the control group, as opposed to both tramadol and celecoxib in the experimental group. An issue present within the study conducted by Reuben, Ekman, Reuben, Scott, & Ekman (2005) is that the study only assessed the healing of the participants one year after the procedure itself.

Recommendation

The clinical recommendation for the use of celecoxib in the perioperative period is that celecoxib can be used for analgesia throughout this time period. The risk of bleeding due to celecoxib use is deemed minimal if present at all by all research articles I found, which shows that celecoxib can be used preoperatively to decrease pain and inflammation. However, if there is tendon-to-bone healing after the procedure, the use of celecoxib should be avoided. Considering the findings of the Oh, Seo, Lee, Choi, Joung, & Kim study (2018), the use of celecoxib can cause impaired healing of a tendon back to a bone. Overall, the risk of bleeding associated with the celecoxib use is not significant enough to consider in this situation; whereas the risk of impaired healing should be considered with the use of this drug during the perioperative period.

Conclusion

As I searched research articles and studies conducted regarding the use of celecoxib during the surgical period, I was able to find enough information to address my PICOT question. However, it was difficult to find studies that addressed the direct categories that were present in

my PICOT question. I did not find any studies that assessed all general orthopedic surgeries.

All of the articles I used looked at either specific orthopedic procedures, or a very broad array of surgeries. It was also difficult to find research that looked into both the healing and bleeding risk in the same article. I feel like I still have an adequate amount of information in order to answer my PICOT question with a confident clinical recommendation.

References

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