CLINICAL OBSERVATIONS

For our standard primary TKA candidates, we routinely group patients into low, intermediate, and high risk categories based on pre-operative blood management strategies. Patients presenting with Hgb greater than 13.0 are considered low risk and are scheduled for surgery without further pre-operative blood management activity. Patients above our transfusion triggers but presenting with a Hgb below 13.0 are categorized as intermediate risk; these patients are encouraged to donate a unit of blood and are expected to have a post-operative re-infusion drain upon recovery. Patients approaching or below our transfusion triggers will have their surgery delayed, be assessed as to the reason for the anemic episode (acute or chronic), and be administered a course of erythropoietin (EPO) to restore Hgb to normal or near normal levels prior to surgery. Across all groups we have observed consistent post-operative changes in Hgb from baseline after TKA surgery.

Since introducing MIS TKA procedures in our practice, we have eliminated the pre-operative blood management strategy detailed above and have added the use of a lidocaine and epinephrine injection at the incision site. Subsequently, we have observed a minor decrease in the change in Hgb from baseline for those patients that would be considered at low risk. This may be related to the minimally necessary surgical incision and minimal tissue handling associated with established MIS TKA techniques. However, use of MIS TKA techniques has not resulted in a discernible difference in peri-operative Hgb in our intermediate or high risk patients compared to our standard TKA surgical technique.

Following the introduction and use of the bipolar tissue sealer for patients undergoing MIS TKA, we observed greater Hgb retention post-surgery in both the low and intermediate risk categories. In the majority of these patients, the bipolar sealer has allowed us to confidently control intra- and post-operative blood loss, thus reducing post-operative blood transfusions and minimizing the associated risks and delay in recovery while avoiding the additional costs to the hospital and payor related to transfusion and delayed discharge.

This paper was prepared by a consultant paid by Medtronic at the time of the publishing.

References


技術 for Using the Aquamantys® System During Total Knee Arthroplasty

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During the course of Total Knee Arthroplasty (TKA), there are several key points where the use of the Aquamantys System (Medtronic, Inc., Portsmouth, NH, USA) has proven especially advantageous over the duration of the operative procedure for specific points where bleeding control is felt to be sub-optimal using standard electrocautery. Within this guide, we provide a step-by-step sequential approach on not only how we identify at which points these occur but also how we use the instrument to its full potential.

For the last several years, we have been performing primary TKA through a limited medial parapatellar arthrotyomy under pneumatic tourniquet control, and found this approach effective for visualization of the knee joint as well as reducing intra-operative blood loss. Following the standard sequence of bone resections for primary TKA, the femoral-tibial joint is distracted at 90° flexion and a laminar spreader is inserted into the lateral joint space. Electrocautery is used to remove the anterior cruciate ligament (ACL) from the lateral wall followed by removal of the posterior cruciate ligament (PCL). Since it is our preference to perform posterior cruciate substituting TKA (PS-TKA), the PCL and remaining contents of the femoral notch are elevated off the notch back to the posterior capsule. The remaining PCL is then freed from the posterior capsule in line with the posterior horn of the lateral meniscus. For those surgeons performing PCL retaining TKA (CR-TKA), obviously this previous step is not performed and the PCL is retained. We then turn attention to the resection of the medial meniscus from the exposed medial joint space, being careful not to injure or transect the medial collateral ligament (MCL). Once this resection has been deemed adequate, posterior osteophytes are removed using an osteotome. This leaves a broad area of posterior capsule exposed, including the area in which the middle geniculate artery penetrates to supply the resected cruciate ligaments. This is the first point at which the Aquamantys System is used.

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First Treatment Area

The posterior capsule is “painted” with the Aquamantys device (170 power, medium saline flow), never being left in one position for more than two seconds and with a suction device alongside to remove pooled saline fluid flowing from the device. Starting medially, the Aquamantys device is used in a gentle circular or side-to-side motion while maintaining light pressure, which ensures constant contact with the soft tissues along the posterior capsule until reaching the notch. Using a suction device to collect the pooled saline from the Aquamantys System is essential to maintain approximately 100°C temperature of the device. Cracking and popping are commonly heard during this process and are not a cause for alarm. The soft tissues will variably change color from red to lighter shades of pink or even tan. Once at the notch, we spend several extra seconds in this area to ensure the middle geniculate artery has been coagulated at the posterior margin of the tibia at the insertion of the PCL. This process is repeated along the posterior capsule of the lateral joint space following the resection of the lateral meniscus and removal of any posterior osteophytes.

Second Treatment Area

The next point at which the Aquamantys device provides benefit is following surgical preparation of the proximal tibial surface. While the tibia is subluxed forward, the peripheral rim of the tibia and the adjacent soft tissues are painted with the device. This maneuver cauterizes the inferior lateral geniculate artery in the posterolateral corner and the middle geniculate artery in the posterior aspect. Care should be taken to avoid the other structures of the posterolateral corner such as the popliteus tendon or, in the case of posterior CR-TKA, the retained PCL.

Third Treatment Area

Once the components have been cemented into place, the drying time required for the cement to cure provides an excellent opportunity for further inspection and, if necessary, use of the Aquamantys bipolar device. At this point, the anterior synovium of the proximally exposed femur can be “painted” with the device along with the synovium in the medial and lateral femoral gutters.

Fourth Treatment Area

After the cement has cured and the final tibial polyethylene articular component has been inserted, the tourniquet is released. It is at this time that final treatment of the soft tissue surfaces is performed. The bleeding soft tissue is painted with the device for a few seconds, moving in circular or side-to-side motions. Direct sustained pressure on bleeding soft tissue is not recommended. Briskly bleeding tissue may require slightly longer contact times, but contact for more than four to five seconds should be avoided. Do not treat any intact ligaments or tendons with the Aquamantys device, specifically the patellar and quadriceps tendons, as well as retinacular tissue and uncovered bone surfaces. Once hemostasis is obtained, a suction drain is placed deep in the joint, and the arthrotomy and wound are closed in a routine fashion. A lightweight sterile compressive dressing is applied.

* For a complete list of treatment guidelines, please refer to the product Instructions for Use.