WEST END ORTHOPAEDIC CLINIC

ANTERIOR CERVICAL DISKECTOMY & FUSION
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This material is intended for those patients who are planning to undergo anterior cervical diskectomy and fusion. This may also be helpful to those patients who may be considering the surgical option and would like to have an idea what they may be getting into.

In terms of my own qualifications, I am a Board Certified Orthopaedic Surgeon, and my main academic interest involves cervical spine problems. I have performed over 700 cervical spine surgeries in my first 18 years here in Richmond. Also, included in this packet is some research material that I generated a few years ago. I reviewed my first 120 patients that had undergone this type of neck operation and I have collected data that includes results, and basically how the patients did. This material has been presented at national orthopaedic meetings and submitted for publication. As you can see from the data, the results of these surgeries have been very good. It is my belief that the best results will occur if the surgeon is smart enough to decide which patients are best candidates for this type of surgery. Hopefully by working together, you and I can decide if surgery is indicated and if this surgery is the best choice for you. Certainly, a minority of patients that have nerve problems in their neck actually come to surgery. I would never pretend that surgery is the only choice for patients who have cervical disc problems or nerve problems. However, for some patients surgery is clearly the best choice.

Along with this informational literature, there are some examples of x-rays on patients who have had a cervical fusion and also some examples of diagnostic studies like MRI that show examples of herniated discs in the neck. You can see these slides on a CD ROM disc provided.

For this particular type of surgery (that we will abbreviate ACDF) the surgical approach is from the front of the neck. In most cases that is actually the easiest way to get to the disc and in many cases that is the only way that we can actually get to discs or bone spurs in the neck to fix your problem. Although it may sound terrible, going from the front of the neck is a surprisingly easy surgical approach, and has surprisingly low postoperative pain. Only one thin muscle is actually cut after the skin incision. After the exposure, the disc or discs are identified. The discs are removed in their entirety, and often there are bone spurs sitting behind the discs that also have to be removed. This takes the pressure off the nerves running to your arms. In my experience, 90% of the patients have almost immediate relief of their arm pain that they were having prior to the surgery, even when they wake up in the recovery room. Of course, once an important structure like a disc is removed, this creates some weakness between the two bones of the neck. This must be supported, and the best way to support the bones is by placing a spacer bone graft. This is the process of fusion. Any time we add bone around the spine to get the bones

growing together, this is called fusion. The bone has to be strong, and it has to grow once the operation is over in order to get a successful fusion.

There are two sources for bone. One is to harvest the graft from your own iliac crest. That is the front part of your pelvis above the hip. There is plenty of extra bone there. It does require making a separate incision. The one thing patients complain about however is the soreness after the operation where the bone graft was removed. It tends to be much more painful at the iliac crest site than it is at the neck incision early after the surgery. Many patients don't like that. Some patients have trouble walking for several days because of the soreness of the hip. This concerns me as well, but traditionally the use of the patient's own bone from the iliac crest has been considered the best bone available. You certainly don't have to worry about disease transmission if you use your own bone.

The second source for bone is what we call "bone bank bone." That is bone that has been harvested from donors, people that have died and left their body to science. These are very good grafts as well. They are certainly easier to use, don't require making a second incision on your body, and thus you have less postoperative pain. The bone graft is very safe, although there is some small risk of something like hepatitis or Aids from a piece of bone graft, but that would be considered extremely remote, and probably could only occur in one in two million cases. Research studies have shown that the healing properties of the bone bank graft are identical to use of your own iliac crest graft. Any bone graft can have problems with healing. Not all bone grafts heal even under the best of circumstances. People get solid fusion between 90 and 95% of the time on average, depending on how many levels are operated on. Some bone grafts fail, some bone grafts are resorbed or fracture, and some patients require re-operation at a later date to add more bone to their neck. Not all patients who develop a failed fusion will require surgery however. The vast majority of my patients in recent years have selected bone bank bone.

These days there is actually a third graft option; a Tantalum (porous metal) spacer is available instead of bone. At the present time, this metal space is an investigational device, but is commercially available, without full FDA approval. There have been good results with this metal spacer in research studies, but it is considerably more expensive. ("Artificial disc" technology is investigational right now, not readily available, and in my opinion, the current designs have significant flaws and significant potential for mechanical failure. Don't hold your breath that "artificial discs" in the cervical spine will be preferred over current techniques for many years to come.)

One technical innovation in recent years has been to add a titanium plate onto the front of the spine once the bone graft is in place. I highly recommend this and, in fact, I have used it on every patient who has had this surgery for many years. The plates are especially designed for the neck, are FDA approved, and are considered to be very safe and reliable. They basically hold the bone together while it is fusing. The main advantage for you is you don't have to wear a brace or collar after the surgery, and the main advantage for me is that the fusion rates are higher and more predictable. The bone grafts seem to do better with the plate. Patients seem to be more comfortable in the first few weeks after surgery with the plate in place. They can do normal activities and drive a

car sooner with the plate in place. Plating does add some expense to the operation and adds a little bit of time to the operation, but the success rate has been very good. Complications with plating have been very few, and normally we do not plan to ever remove the plate from your neck unless there is some problem. Only about 1% of the patients have required the removal of the plate at a later time for problems such as loosening.

So, the surgery consists of the removal of the disc and bone spur, placement of a bone graft, in most cases placement of a plate, and then the operation is done. The operation may take between 1-1/2 to 3 hours, depending on complexity of the procedure and how many discs may be involved. Most patients can leave the hospital after 24 hours. A few patients may stay two days in the hospital if they are slow to walk or are having elevated pain levels, usually from the bone graft harvest site. On patients who are very overweight, we do not recommend that they have bone graft harvested from their pelvis, since it makes the surgical wound very deep and very painful with a higher risk of bleeding or infection. All other patients are given a choice between using their own iliac crest bone graft or bone bank graft. However, only a minority of surgeons nationally are still recommending iliac crest for their ACDF patients.

Usually there are no stitches to take out after the surgery. Usually you don't have to wear a brace or a collar unless you feel more comfortable in one. In many cases, we allow you to drive a car after 2-3 weeks. You can only do light activities or light lifting the first 6 weeks after the surgery. A few patients who do light office work might even get back to limited hours from 3 weeks after the surgery. People who do light work or office work for their regular job may go back to these types of duties at 6 weeks after surgery. For people who do heavy work or heavy manual labor, they are likely to be out of work for 3 months after surgery.

The results of these surgeries have been very good, probably the most reliable and successful spine operation that we have. Nonetheless, no discussion of the surgery would be complete without listing major complications of the surgery, or at least the most common complications of these surgeries. First of all, we can say that the risk of a major complication would be considered 1% or less. Major complications would include bleeding that requires transfusion, deep wound infection, nerve damage, paralysis. Fortunately, as of 2008, we have had no patient that ever developed infection in their neck wound. Other potential complications include vocal cord problems or vocal cord paralysis that would affect your speech. Most people develop some temporary slowness of swallowing just from the swelling, and we have not had anyone have any damage to their esophagus (the swallowing tube). Damage to the esophagus would be considered a potential complication of this procedure. Obviously, this surgery is done under general anesthesia and, of course, patients may develop complications related to the anesthesia. This is also very uncommon. Although there are major arteries in the neck, blood transfusion is rare after these surgeries. In terms of the iliac crest bone graft site, bleeding and infection could occur at that surgical wound as well. Also, as a minor complication, some people develop numbness on the outer side of their upper thigh just below where the bone graft came from, and this is bothersome to some people. For the

patients who have plates in their neck, there can be complications related to the metal, as I have mentioned above. Any type of plate or screw can loosen, have to be removed, even cause local damage to the neck. Fortunately in our patients, we have not seen anyone have any damage to their neck as a result of plating, and we have only removed 3-4 plates in the last 15 years, for hardware failure.

As I have said already, this is a very reliable operation. The patient has to understand the purpose of the surgery. In most cases, the main purpose of the operation is to relieve nerve pain in your arm. The operation usually does not work to relieve arthritis type neck pain. If you are having a lot of neck pain and not much pain in your arm, then this operation is probably not for you. Of course, there are special situations where patients have a structurally unsound cervical spine and require this type of fusion just to keep their neck from becoming progressively unstable. Those patients may have a lot of neck pain. That is a special circumstance. For the most part, we are operating on people who have some type of nerve problem that needs to be fixed. This operation is not very reliable for neck pain and it is not very reliable for headaches or those types of symptoms, except under special circumstances. This operation is very good for protecting nerves and protecting the spinal cord.

I would be happy to answer any other questions you may have face to face. I would be happy to discuss non-surgical options for your condition, and what may be the natural history of your condition left untreated. I very much enjoy helping patients with these types of neck problems. It is my main professional interest. It is the only subject that I teach at the VCU Medical Center. The only surgeries I perform at VCU involve cervical spine problems.

Again, please refer to the research data presented in this packet. I do have CDs available to office patients that include scans and x-ray examples of cervical spine problems. You may access my website at www.weoc.com (go to home page address; article is under Dr. Urquia's home page).

I would also refer you to independent websites that you can access off the Internet, which gives additional educational material. These websites are: www.dynomed.com. and spineuniverse.com. There you will find several categories of cervical spine topics, including radiculopathy and spondylosis.

AAOS (American Academy of Orthopaedic Surgeons) also has a website with educational materials on the spine at www.aaos.org. Go to the home page, then click on Patient/Public information, then look for Spine topics.

Our new WEOC website also has educational materials.

A PROSPECTIVE REVIEW OF 121 CONSECUTIVE CASES

INTRODUCTION: A prospective review of 121 consecutive surgeries for radiculopathy, myelopathy, infection or tumor, same surgeon. Statistical analysis presented on final symptomatology, effect of anterior plating, and factors that affected bone graft healing.

METHODS: Data obtained from office records, direct intraop measurements of spinal and bone graft dimensions, and measurements of pre- and post-op radiographs for graft union, interspace heights, and kyphosis. Surgeries included modified Smith-Robinson ACDF, corpectomy, and use of Synthes anterior CSLP system.

RESULTS: In the unplated group (124 levels) there were 82% Good or Excellent results, with 94% of patients having complete relief of radicular symptoms. 89% of patients in this group returned to premorbid activities. Grafted interspace height eventually decreased back to preop height when no plate was used, but with only 8% nonunion rate, 11% graft collapse rate, and 13% of cases with kyphosis. Initial interspace distraction greater than 3 mm had no statistical effect on rates of graft collapse, kyphosis, or nonunion. In the plated group (83 levels) there was negligible loss of interspace height, no nonunion or kyphosis, and one case of plate loosening. 91% Good or Excellent results in the plated group, no patients with residual radiculitis, and 82% return to premorbid activities.

DISCUSSION/CONCLUSION: Found superior results with use of anterior plates. Graft union and alignment were affected by such independent variables as smoking, graft collapse, and plating, but not by initial interspace distraction or systemic disease. Recommend use of autologous graft only, with preservation of subchondral plates. Recommend aggressive posterior decompression including osteophyte and PLL resection in majority of cases.

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