CERVICAL SURGERY INFORMATION HANDOUT

Welcome to Capital Neurological Surgeons and thank you for trusting us with your neurosurgical care. Please take some time to review this handout and feel free to contact us with questions or concerns.

BASIC ANATOMY: CERVICAL SPINE

What is the cervical spine? It is the first 7 bones of the spine closest to the head. There are 31 bones in the spine, 7 cervical, 12 thoracic, 5 lumbar, 5 fused sacral segments and the coccygeal fused segments. The spinal cord lives inside a large space inside the bone called ***spinal canal***. Each bone has two holes, one on the left and one on the right. These two holes create tunnels called ***intervertebral foramen*** on the side that nerves travel through to leave the spine and enter the arms. Each bone is connected to another bone in the front with an ***intervertebral disc*** and two ***facet joints*** in the back. This can create two very different problems:

1. **Disc herniation/slipped disc**: The disc can be injured and be slipped/herniated, which is seen in sudden injuries such as being hit or car accident or falls.
2. **Cervical Stenosis**: The disc can also dry out over a long period of time and old dried discs are weaker than young healthy discs. This creates stress on the intervertebral joint and the body responds by trying to make the joint stronger by adding bone. This is called *bone spurs* or *osteophytes*. Unfortunately, drying out discs is a part of aging and everybody will get this during their lifetime starting at age 40.

CERVICAL SPINE DISEASE: what is it and why does it hurt?

Cervical spine disease can create pain in the neck. The three components of cervical spine disease that can be addressed by surgery is

1. Pinched nerve
    a. Pinched nerves create pain because they are squeezed by disc and bone spurs as they exit from the spine through tunnels on the side called ***intervertebral foramen***. The pain is usually sharp and stabbing and electrical in nature. It can shoot into the arms and fingers. Pinched nerves can also cause weakness of the arm and hand/fingers. Pinched nerves can also cause numbness and parasthesias, which is a feeling of pins and needles in the arm and hand. Numbness is usually a sign of a permanently damaged nerve and this usually does not improve with surgery.
2. Compressed spinal cord
    a. Compressed spinal cords can also cause pain, weakness and numbness, but more concerning, compressed spinal cords can cause paralysis and even death. Spinal cords can be compressed by disc or bone spurs or misaligned and stable spines. Spinal cord injuries are usually permanent and patients may not recover lost function.

3. Misalignment/instability of the spine
    a. The most common misalignment of the spine is when the neck is bent forward or kyphosis. This can create severe strain in the muscle of the neck as well as the joints in the neck.

Symptoms that cervical surgery cannot treat include

1. Arthritis
    a. This is long term chronic inflammatory changes in the joint of the spine. 100% of all people will develop arthritis in the joints of their body as they age just as 100% of all people develop wrinkles in their skin as they age. This is a function of wear and tear on our bodies. Patient reports this feels like a dull constant ache or grinding feeling in the neck. Surgery does not change arthritis and cannot "cure" arthritis.
2. Myofascial syndrome
    a. Muscles, tendons, ligaments, skin and the soft tissue that makes up the neck that wraps around the spine can all be damaged. Car accidents or falls can create severe myofascial pain. Patient reports this feels like a tight squeezing feeling in the neck, shoulder and back of the head. Surgery does not treat these symptoms.
3. Neuropathy
    a. Nerves can have injury or even disease. Just as we can have disease of the bone, disease of the skin, disease of the lungs etc, we can have disease of the nerves and this is called neuropathy. Symptoms can feel like ice water running over the arms or even a burning numbness. This is largely permanent and surgery does not treat these symptoms.
4. Spinal cord injury
    a. Spinal cord injury is permanent and can be life and limb threatening. Severe weakness, bowel and bladder incontinence (inability to control urination or bowel movements), numbness and neuropathic burning pains, are the common presenting symptoms.

So there are neck pains that can be treated by surgery and there are neck pains that cannot be treated by surgery. Patients should have an understanding of the cause of their pain so that they may have realistic expectations for surgery. So what is the surgery?

SURGERY: Anterior Cervical Discetomy and Fusion ***ACDF***

The most common surgery of the cervical spine is ***ACDF.*** If a patient has spinal cord compression due to ***cervical stenosis*** or pinched nerves from *bone spurs* or a *disc herniation*, then the surgeon can cut the bone spurs out or cut the disc out and therefore can decompress the compressed spinal cord or squeezed nerve. Now that the disc is removed, there is missing stuff and we have to replace your missing disc with a ***cage*** to create a ***fusion***. Let's review the surgery in more detail.

ACDF is performed under general anesthesia. There are risks to being under full anesthesia. There are concerns about patient's medical suitability for surgery in regards to the heart or lung. So prior to any surgery, patients will need to be cleared for surgery by their family doctor. EKG and labs as well as a

chest x-ray may be requested. All reproductive age females will also have a urine pregnancy test provided.

The patient will be intubated during surgery. This means that a breathing tube will be inserted into the throat and this may cause a sore throat that should get better by 1-2 days after surgery. Patient also complains of severe dry mouth due to the anesthetics and this also resolves within 1-2 days.

The surgery is performed by making an incision in the front of the neck. Vital structures such as the esophagus/food tube and trachea/breathing tube are gently retracted aside during surgery and can result in feeling of sore throat and difficulty swallowing, especially if the esophagus is swollen after surgery. While this is usually temporary and resolves by a few days time, difficulty swallowing can be a permanent issue and this is a risk of this surgery. Stretching of the nerve to the voice box can result in hoarseness of the voice and this may also be permanent, however it usually resolves after a few days.

Large important blood vessels in the neck, such as the carotid artery and the jugular vein will also need to be retracted for surgery. Injury to these vessels is rare but can result in death or stroke if injury occurs.

Once these vital structures are carefully retracted, we can access the front of the spine. There are two large muscles called *longus colli* muscles which run along the front of the spine from the base of the skull to the back of the chest. They need to be moved aside to access the disc space. Most patients complain about *longus colli* pain - the back of the throat, the back of the head and the back of the chest. Pain medications will be provided to help with the pain. Please note that the pain is actually worse 2-3 days after surgery as the muscles “wake up” after surgery and chemical inflammatory products are released by the body. Usually 5-7 days later, the pain improves.

Once the spine is visualized, the disc is resected with drills and sharp instrumentation. While great care is taken to avoid injury to the spinal cord and nerves, damage to these vital structures is a rare but devastating risk of surgery which can results in paralysis or death. Tearing of the lining of the spinal cord can create a spinal fluid/CSF leak, which can increase infection rates and this can result in meningitis which can result in death. CSF leaks occur at a rate of 1-3% overall and usually can be treated with a small amount of organic glue called Duraseal.

Once the disc and bone spurs are removed and the spinal cord and spinal nerves are decompressed, a plastic cage is inserted into the disc space. The cage is filled with bone putty and your bone will grow into this putty over 1-2 years. This is called *fusion*. This has been demonstrated to be superior to the “artificial disc” in 5 year follow up studies and is the gold standard of care. Fusion rates approach 99% in most patients and are less than 50% in smokers according to some research studies. Fusion rates are also lower in menopausal women, osteoporosis, and Asian or Caucasian ethnicity. The only parameter that can be controlled is tobacco smoking. Patients must NOT smoke for 1-2 years after surgery. It is the responsibility of the patient to determine if they can refrain from smoking after surgery.

The cage is reinforced with a titanium **plate and screw** construct. This is a low profile plate and usually cannot be felt by the patient once implanted. However, it can break with strong trauma such as falls.

X-rays will be taken several weeks after surgery to evaluate the plate and screws. The plate and screws are x-ray safe, MRI safe, metal detector safe, airport safe. You may fly with them and you may swim with them. They are a permanent implant.

Once fused, most patients feel that they can move their neck like normal. This is because the adjacent levels above and below the fused levels are doing more work. This can create ***adjacent level disease***. This has been shown to increase the wear and tear on the levels next to a fused level such that there is a risk of needing surgery on the adjacent level at a rate of 16% over 5 years.

For some patients, a cervical collar/brace is provided. This is to be worn at all times and may be removed for 10 minutes a day to clean the collar and to clean the neck with a moist towel. The incision is not water tight and the patient is asked to keep it dry for 2 weeks. Usually sponge baths are used for the first 5 days and then the patient may shower after 5 days, but they cannot get the incision wet. The patient may be asked to wear the collar for 6 weeks and up to 3 months or longer depending on the patient's bone quality and likelihood of a successful fusion.

After surgery, the patient will remain in the recovery room for 1-2 hours and then they are taken to the ASU on the 4th floor. The phone number to the ASU is **916-453-4214**. Once in their private room, the patient may get up and walk around or use the rest room. For dinner, the patient is requested to sit in a chair to eat. No bed rest is recommended. If you are asleep, then be in bed - if you are not asleep, then don't be in bed. The patient is discharged the next day with their pain medicine prescriptions. They will have to call to make an appointment to see me two weeks after surgery for an incision check. Follow up visit schedules are 2 weeks after surgery and 3 months after surgery. Usually, an x-ray is ordered for the 3 month visit. Usually physical therapy is not required however, if patients have difficulties with normal activities such as getting out of bed or getting to the bathroom, then physical therapy may be ordered at the 2 week visit.

For the first two weeks, the secret is rest and recovery. Almost half of the patients stop their pain medications one week after surgery and feel like exploring their new limits however, I advise patients maintain a low and reasonable rate of activity and advance their activity as instructed. It is the responsibility of the patient to exercise restraint and allow their body to heal completely.