Plasma Disc Decompression /Nucleoplasty

For Nurses

What is PDD/Nucleoplasty?

- Plasma Disc Decompression (PDD) /Nucleoplasty is a minimally invasive procedure developed to treat patients with contained disc herniations or bulging discs causing low back and leg pain.
- PDD literally means partial removal of the nucleus (nucleus pulposis is the center gel-like substance of the disc) using Coblation®.

Coblation® Technology

- Coblation - “Controlled Ablation”
- Tissue Ablation – tissue removal via plasma molecular dissociation
- Voltage mediated process
- Temperatures in between 40-70°C
- Coblation described in:

Ablation By-products

- Tissue is broken down into elementary molecules and low molecular weight gases, i.e. oxygen, nitrogen, hydrogen, carbon dioxide, etc.
- Gases exit treatment site unaided.

Minimally Invasive

- The procedure is minimally invasive because it is done through a needle with out making a surgical incision.
- It is most useful in patients with nerve roots irritation due to smaller disc bulges or contained ruptures.

Disc Herniation

- Typically when a disc herniates, the annulus fibrosis opens with fissures and allows the nucleus pulposis to protrude and the annulus compresses structures such as nerves.
Contraindications:

- Systemic Infection
- Skin Infection over the needle site
- Patients on blood thinning medication (Coumadin, Plavix)
- Pregnancy
- Medical co-morbidities that preclude surgical intervention

Canning Principle

Place prepared Bell Jars in to a hot water bath and heated for a few seconds.

When the jars cool a pressure seal is formed and the lids become sucked in.

Candidates For Plasma Disc Decompression

- Patient has one symptomatic contained, focal herniated lumbar disc.
- Patient’s age 18 – 75 years old
- SNRB or LESI for symptomatic herniated disc, received between 3 weeks and 6 months (without relief).
- A VAS for Radicular pain of 50% or greater on a scale of 0 to 100.

Criteria For PDD/Nucleoplasty (Continued)

- Radicular pain concordant with image findings (MRI or CT).
- The disc herniation must be no greater than 1/3 the sagittal diameter of the spinal canal.
- Conservative management including medications, physical therapy and epidural steroid injections should be documented as ineffective.

Exclusion Criteria

- Previous spinal surgery at, or adjacent to, the level to be treated.
- Patient is morbidly obese (BMI>40).
- Patient has spinal fracture, tumor or infection.
- Radicular pain originating from more than one disc level.
- Axial (back) pain greater than radicular (leg) pain.
- Clinical evidence of cauda equina syndrome.
- Progressive neurological deficit.
- Radiological evidence of moderate/severe stenosis at the level to be treated.

Exclusion Criteria cont.

- Radiological evidence of spondylolisthesis at the level to be treated.
- Allergy to contrast media or drugs to be used in the intended procedure.
- Severe disc degeneration with greater than 50% loss of disc height.
- Evidence of extruded or sequestered disc herniation on MRI.
Risk Factors

- Nerve root injury
- Discitis
- Exacerbation of pain
- Failure to relieve the pain either short or long-term
- Allergic reactions to injectates

Pre-Procedure

- Patient teaching:
  1. What to expect post procedure.
  2. Limitations to activity!
- NPO, may take normal medications with sip of water.
- IV antibiotics one hour prior to procedure and patient to have a working/running IV.
- All patients are to have an escort who can return the patient home and ensure his/her well being for the remainder of the day.

Nurse’s Role During The PDD

- Set up for the procedure.
- Run the fluoro.
- Conscious Sedation for the patient.
- Monitor the patient during the procedure.
- Time the procedure: 6 seconds Ablation & 12 seconds Coagulation.

Plasma Disc Decompression

- Uses a special access needle which is placed under x-ray guidance.
- A wand-like device uses a plasma field to remove disc material and seal the channel made by the needle.
- Several channels are made depending on how much disc material needs to be removed.

PDD Needle Placement
Plasma Disc Decompression

1mm channels made in the disc

Linda Beth May, BSN, R.N.

PDD Procedure

- Strict sterile technique.
- Mandatory use of C arm fluoroscopy.
- Optional use of sedation.
- Placement of 17 gauge introducer needle at the annular-nuclear junction.
- Placement of wand to pre-marked level.
- Contact annulus of other side of disc by advancing until resistance is met. Depth is marked with pinch clip.
- Withdraw the wand back to premarked level.
- Attach sterile cable and set controller to Level 2.
Procedure (continued)

- Make a minimum of 6 passes with the wand.
- Advancement is done with ABLATION at a rate of 6 seconds.
- COAGULATION (retraction) is done with coagulation at a rate of 12 seconds.
- On completion instill antibiotic in to disc then remove wand and needles.

Recovery

- Patient is lying flat on stretcher for 2 hours.
- Nurse will monitor post sedation standards.
- Patient is cautioned to log roll to a standing position and to either recline or lay down in back seat of car.
- NO SITTING @ a 45-90 degree angle!!

What Not To Do!!

- Prolonged sitting
- Strenuous exercise
- Any activity that would cause bending or twisting.
- Let’s talk sex
- Skiing, soccer, or any sport that may reherniate the disc.

Case Studies

- Joe is a 42 yr old male with h/o low back pain that radiates down his left lower extremity. He is s/p provocative discography with concordant pain at the L4-L5 intervertebral level. At the L4/5 level there is a small central disc protrusion. There is no evidence of neural foraminal or spinal stenosis at this level per MRI.

Joe Continued

- April 11, 2005 Joe underwent L4-L5 PDD.
- Leg pain post procedure went from 6 out of 10 to a 2 out of 10.
- IMPRESSION: (MRI September 5, 2005) Resolution of focal disc protrusion L4-5 since previous study.
Case Study: Reggie

- 45 year old male with 2 year history of low back pain and left lower extremity radiculopathy for which he had a PDD at L5-S1 on 8/17/06.
- September 7, 2006 Reggie no longer needs crutches to walk. He reports 80% relief of radicular pain with occasional & transient paresthesias.
- 80% improvement of low back pain. No longer taking Oxycodone, Naprosyn and Flexeril since the Nucleoplasty.
- Overall quality of life and pain levels have improved!

The Poster Child

- Alan is a 54 year old contractor with a history of left-sided L4-L5 radiculopathy who underwent a PDD 8/19/2005; with 90% relief of the leg pain.
- For 6 months post Nucleoplasty Alan was pain free, no longer required any pain medication.
- February 2006, Alan decided to go skiing with his family.
- MRI 2/7/06 showed a prominent paracentral protrusion @ L4-L5 hitting the right-sided L4 nerve root as well as bulges @ L2-L3 and L3-L4.
- Dx: Recurrent progressive herniation, more prominent to the right than left.
- Restarted on pain medication and needed surgical consult.

The End Result

- Intense PT for 4 months without relief.
- Alternative treatment modalities: Chiropractic Spinal Decompression and exercise program.
- Bottom line, he can now do stretching and intense exercising where he couldn’t stand up straight prior to the PDD.

Spinal Decompression

Rose

- 62 year old hair stylist who presented with low back pain as well as left lower extremity radiculopathy.
- She underwent SNRBs @ L5 Nerve Root in both August 2005 & December 2005, without significant relief.
- MRI: L4-L5 disc protrusion displacing the Left L5 Nerve Root.
- Leg pain 1s 10+/10.

Rose

- Could not stand up straight and was not able to walk unassisted.
- 3/10/06 PDD
- Recommended Rose to go back to work after 2 weeks, not to bend or twist.
- August 2006, 100% relief and able to work and resume a normal life.
What We Learned

• Patient teaching pre-procedure is extremely important.
• Post procedure education on limitations is a priority.
• Follow up appointments at 2 & 6 week intervals to monitor progress is necessary.
• You can only help the patient that helps themselves.