CT-guided percutaneous herniectomy and discectomy:
Technique description and preliminary experience

Poster No.: C-2386
Congress: ECR 2013
Type: Scientific Exhibit
Authors: M. Cifrian Pérez, J. H. García Vila, N. Correas Alguacil, S. F. Marco Domenech, M. S. Arnau Ferragut, K. Delgado Barriga; Castellon/ES
Keywords: Neurorradiología, columna dorsolumbar, Músculoesquelético, columna dorsolumbar, Interventional non-vascular
DOI: 10.1594/ecr2013/C-2386

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method ist strictly prohibited.
You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.
Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.
www.myESR.org
Purpose

Technique description of CT-guided percutaneous herniectomy and discectomy.

To assess short-term efficacy of CT-guided herniectomy and discectomy in treatment of lumbar radicular syndrome refractory to conservative treatment.

Methods and Materials

CT-guided percutaneous herniectomy is a minimally invasive spinal procedure whose purpose is to extract the hernia or a portion of the hernia to reduce the pressure on the nerve roots. The removal of a small amount of tissue is sufficient to reduce hernial intradiscal pressure and remove the disco radicular conflict. Fig. 1 on page 4

We perform a prospective study to evaluate the response to treatment by CT-guided percutaneous herniectomy in 11 patients with low back pain and radicular syndrome due to hernia source refractory to conservative treatment.

Inclusion criteria:
- Patients with radicular pain and disco radicular conflict evidence on MRI.
- VAS greater than 6.
- Adequate Disc-hydration (hyperintense on T2)
- Preservation of disc height.
- Pain relief after performing an epidural injection and periradicular pulsed radiofrequency treatment to confirm the disc-radicular conflict as a cause of pain.

Exclusion criteria:
- Uncontained disc herniation
- Inability to tolerate the procedure with local anesthesia.
- Coagulation disorder
- Infection
- Pregnancy
- Absence of radicular pain syndrome
- Absence of good clinical-radiological correlation (MRI)

CT guided procedures:
CT provides precise control in both bone and soft tissue. We can achieve real time visualization of needle progression along the planned path using a combination of CT and C-arm fluoroscopy or CT-fluoroscopy.

Strict adherence to aseptic techniques is required in all bone interventional procedures.
Patient preparation and positioning:

- The patient is positioned in the prone position on the CT table.
- A pertinent slice is selected, where the target and the correct needle route are clearly visible.
- Vertical position is shown on the patient's skin by the CT laser light beam. - The entry point is located on the skin by placing a radio-opaque marker. The needle is introduced into the disc at the exact level of the hernia (intra-hernial approach)

- The skin surrounding the needle entry point is covered with sterile drapes. Then, local anesthetetic is injected all along the needle pathway. Local anesthesis allows patient cooperation, which can be useful to indicate whether there is nerve impingement during the procedure and facilitate the correction of the needle position.

- Once the entry point is determined, the 22 G needle is introduced Fig. 2 on page 5 under CT guidance. Real time fluoroscopy is not usually necessary and sequential, regular CT slices are, in most cases, sufficient to achieve correct needle placement.

Technique:

- The needle is introduced into the disc at the exact level of the hernia (intra-hernial approach). Fig. 3 on page 5 Fig. 4 on page 5

- A provocative discography test makes possible to confirm the disco-radicular conflict by reproducing the pain. Fig. 5 on page 6 Fig. 6 on page 7 Fig. 7 on page 9

- A 17 G needle is put in place using the same route up to the level of the disc herniation. The engine creates a worm that mechanically pushes the nucleous pulposus up the length of the probe and decompresses the disc.

- A progressive rotation of the probe allows the extraction and curettage of a large volume of the hernia. Fig. 8 on page 10

- The patient remains hospitalized 24 hours after the procedure.

Evaluation:

The parameters for evaluation were measurement of pain by the visual analog scale score (VAS), scale of quality of life EuroQol-5D and Oswestry disability index. The scales were evaluated previously and after treatment. Clinical evaluation was assessed previous treatment, 1 and 3 months after the procedure.

- European Index of Quality of Life (Euroqol-5D) is an instrument for assessing the quality of life. It comprises the following five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Results obtained in the analysis of each dimension of this scale were analyzed according to three levels: no problems (1), some problems (2), and severe problems (3).
• The Self-Assessment Euroqol Health State expresses the patients perceived health status at the time. This scale ranges from 0 to 100, with 100 being the best possible state of health and 0 the worst according to the patient self-assessment.

• Oswestry test is an assessment tool that measures the functional status of patients. It values several items: pain intensity, standing, personal care, sleep, weight lifting, sexual activity, walking, socializing, sitting and traveling. The total score is expressed as a percentage (0 to 100%). Functional limitation categories are 5: low (0-19 points), moderate (20-39 points), severe (40-59 points), disability (60-79 points) and maximum (80-100 points).

• VAS: visual analog pain scale, in which the patient reports their pain perception from 0 (no pain) to 10 (maximum pain).

To evaluate the response to treatment defined variables: VAS difference (Vas before, 1 and 3 months after treatment prior month and three months after treatment), Euroqol difference (Euroqol before and after treatment), and Functional Assessment Oswestry test difference (before-after treatment).

Images for this section:
**Fig. 1:** Representation disc herniation with nerve root involvement.

**Fig. 2:** Percutaneous herniectomy and discectomy set: Herniotome ® Gallini.

**Fig. 3:** Extruded disc herniation with nerve root compression
Fig. 4: L5-S1 left posteromedial disc herniation
Fig. 5: Herniectomía percutánea. Abordaje interlaminar intraherniario Percutaneous herniectomy. Inter-laminar intra-hernial approach.
Fig. 6: Provocative discography previous to percutaneous herniectomy

Fig. 7: Provocative discography provides both anatomical and functional information about a disc suspected to be diseased, reproducing the patients symptoms.
Fig. 8: Portion of hernia extracted during the procedure
Results

The analysis shows a significant decrease of the VAS mean score and improvement in the functional assessment Oswestry test scale and quality of life EuroQol-5D from the initial determination; which are persistent in the clinical follow up 1 and 3 months after the procedure.

**VAS score**

VAS score improved significantly in all patients after percutaneous herniectomy. Fig. 9 on page 13

**EurQol 5**

There is a significant decrease in each of the dimensions of the EuroQol 5 in all patients, being most pronounced in the area of pain / discomfort, mobility and daily activities. Fig. 10 on page 14

**Functional Assessment Oswestry Test Scale**

There is a significant decrease in each of the dimensions of the functional assessment Oswestry test, being most pronounced in the area of pain intensity, standing, personal care, lifting, walking and socializing. Fig. 11 on page 15

No major complications were observed either in the immediate postoperative period, or in the clinical follow up one month and three months after the procedure. Only 3 of the 11 patients reported residual paresthesia.

**Images for this section:**
Fig. 9: Graphic depicting the initial VAS score, one month and three months post-treatment.
**Fig. 10:** Representation of the Euroqol5 scale: initial evaluation, one and 3 months post-treatment evaluation, showing improvement in all patients.

![Graph showing Euroqol5 scale improvement](image)

**Fig. 11:** Representation of Oswestry test. Evaluation before, one and three months after treatment. Improvement of functional limitation in all patients.
Conclusion

CT-guided percutaneous herniectomy is an effective treatment for lumbar radicular syndrome refractory to rehabilitation treatment.

With a careful selection of patients, percutaneous herniectomy is a minimally invasive alternative to spine surgery.

References


Personal Information