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## **The methodology of back lateral endoscopic percutaneous transforaminal extraction of intervertebral hernia under X-ray control**

**Abstract:** The method of minimally invasive surgery of extraction of intervertebral hernia is described. The advantages of back lateral endoscopic percutaneous transforaminal extraction of intervertebral hernia under X-ray control are showed in this article.

**Keywords:** minimally invasive surgery, endoscopic discectomy, intervertebral hernia, percutaneous

### **Introduction**

World's sciential and technological progress during last 20 years contributed to emergence of minimally invasive surgery. The methods of laser vaporization of intervertebral hernia, cold ablation, endoscopic mechanical discectomy, the wrinkling of hernia with drugs were created and put in practice. The rapid increase of minimal invasive surgeries of intervertebral hernia was observed from 1995 to 2000. Endoscopic extraction allows extracting intervertebral hernia with mechanical method. The indications and results of endoscopic discectomy are often incompatible [3, 545–51; 4, 633–651; 9, 317–324; 14; 15, 21–30; 1; 5, 405–419; 17, 225–229]. Some authors think that endoscopic surgery has strict limits and their results don't differ from the results of intervertebral hernia vaporization. Other authors have developed the techniques of endoscopic surgery and they offer it for intervertebral hernia extraction despite the size and location [11, 23–32; 13, 2231–2239; 12, 311–320; 8, 121–128; 7, 314–318; 2, 157–174; 6, 557–560]. The types, indications, efficiency of endoscopic surgery are incompatible in literatures. There are many methods of minimal invasive surgery and the most efficient should be chosen, which will allow operating on intervertebral hernias despite size and location [10, 210–217; 16, 349–353].

### **Material and Methods**

With endoscopic transforaminal method we have operated on 203 patients. In 11 (5,4%) cases patients were operated on because of foraminal stenosis of spine tube. In 192 (94,6%) cases patients were operated on because of intervertebral hernia.

In our studies 95 (46,8%) patients had intervertebral hernia on L4-L5 level, in 70 (34,4%) cases the intervertebral hernia was on L5-S1 level and in 27 (13,4%) cases it was on L3-L4 level. We have operated on patients with foraminal, extraforaminal, lateral, central and mix located intervertebral hernia. We have used tools and endoscope for intervertebral hernia extraction produced by Karl Storz and Max-More. The operations were done under neuroaxial epidural anesthetization. While epidural anesthetization the patients' consciousness was clear and the motor function of lower limb was preserved in contrast to spinal anesthetization. While epidural anesthetization nerve root damaging is excluded. If the surgical tool touches nerve root the patients will feel it and will inform the surgeon. The patients' position on surgical table is on the opposite of hernia. The surgical entrance is above ischium top, 10–12 cm. lateral from medium line. Inserting the needle from this point it reaches to the required level of art, after which X-ray scope is done. Removing the needle metal pin is put into it, then the

needle is removed and 1 cm. incision of skin and soft tissues is done. After all these the dilators of soft tissue (3 and 8 diameter) are put on pin. With dilators it's easy to շերտազատել soft tissue from skin to bone, due to which there wouldn't be bleeding and soft tissue

damaging. After all these the dilators were removed and the case of oval nail was put. The pin is removed and the nail մեջդիրը was put into the nail case and after reinforcing it is spherical. It was held to intervertebral hernia by striking with hammer (Pic. 1).



a



b

Pic. 1 The process of putting oval nail: a – the case of nail is put on pin; b –the case and nail in collected form

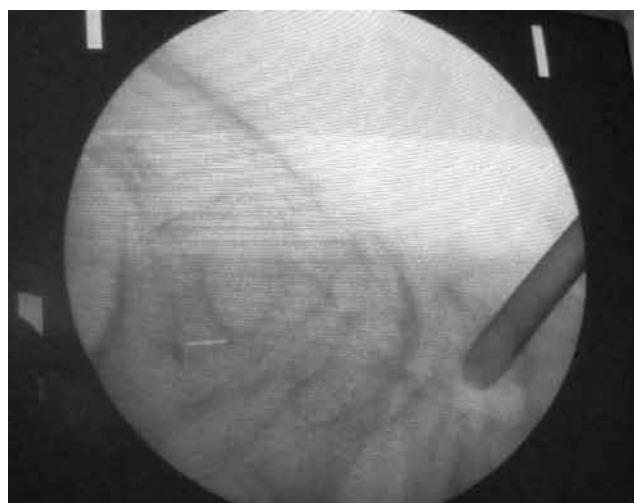
After removing the մեջդիր of oval nail, the pin was put into the case and the case of needle was removed. The first wimble was placed over the pins (4 diameters). The pin was removed.

Lancing spinal tube the prolaps was again felt. Similar actions were approximately done, exchanging wimbles of 5, 7, 8 and 9 diameters.

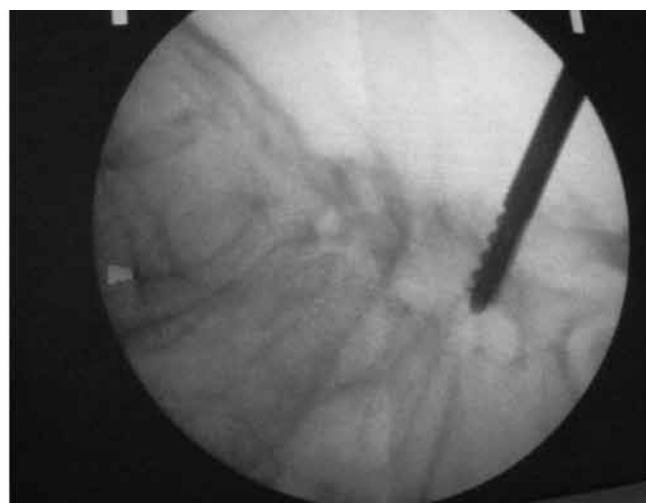
After these actions the last wimble was removed and working tube was held through pin. X-ray control was

done in order to prove that working tube was in spinal tube (Pic. 2).

After that endoscop was put and the second period of endoscopic extraction of intervertebral hernia was begun. I would like to mention that the endoscope used during the operation has working tube with 3 diameters which allows putting and using clam with 2; 2,5 and 3 diameters. Besides endoscope has 2 clams for constant washing (Pic. 3).

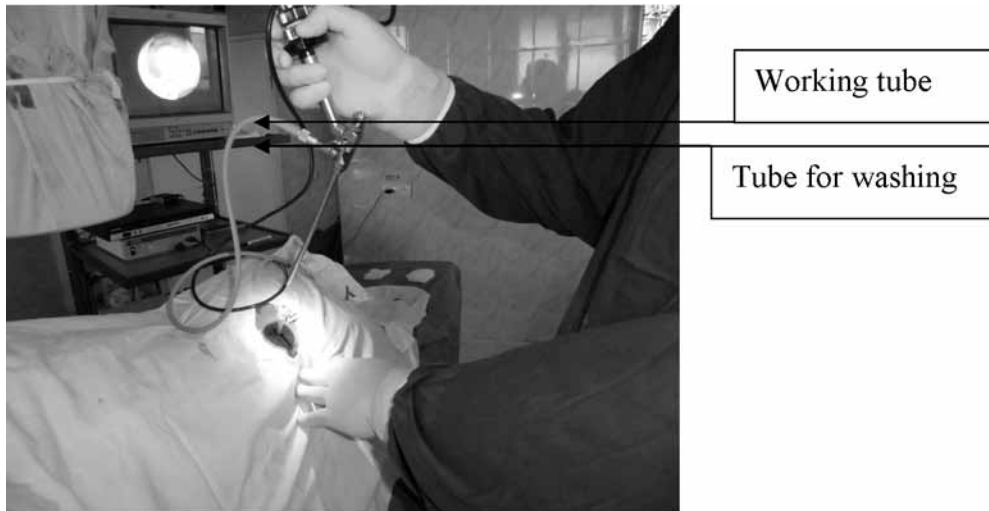


a



b

Pic. 2. a – the wimble of 5 diameter; b – working tube placed into spinal tube

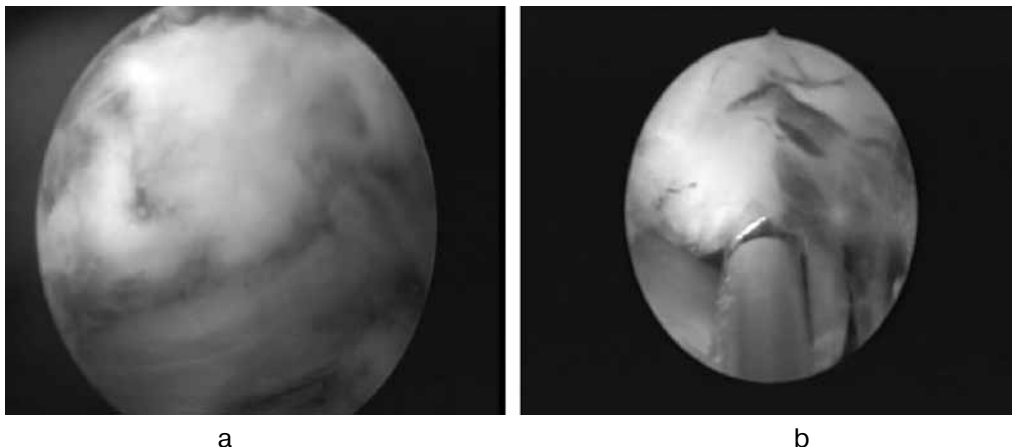


Pic. 3. The structure of endoscope for intervertebral hernia extraction

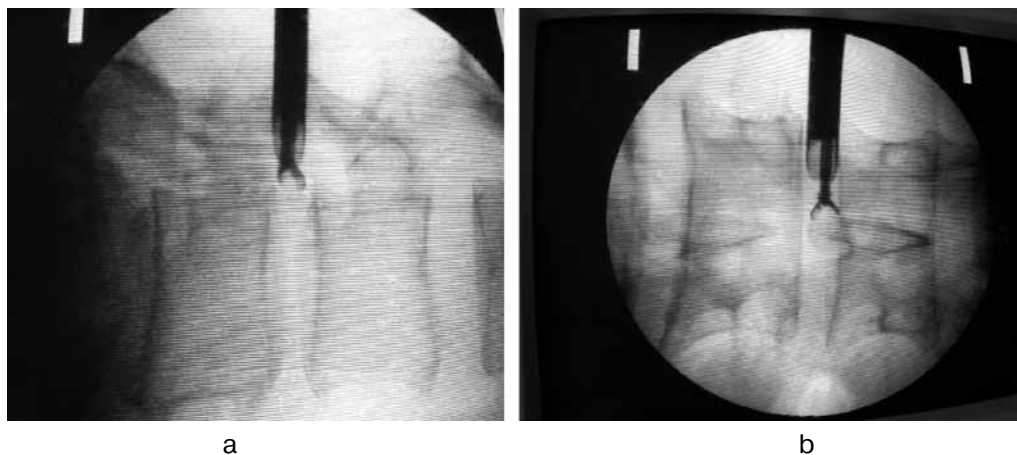
Putting endoscope into working tube was the beginning of second period. At first there would be difficulties for endoscopic extraction, as the view was closed by blood clots. The blood clots were washed by NaCl 0,9% liquor and were removed through endoscopic working tube, after which yellow ligament and the hole in it was seen, which as a rule was closed with bone and yellow ligament pieces. After the extraction of bone and yellow ligament pieces nerve root and intervertebral hernia,

which compressed it, were seen. After differentiation hernia from nerve root the endoscopic extraction of hernia was begun. The hernia was extracted with clam (Pic. 4).

The latter was removed in pieces. 1–1,5 cm working area was opened with the open ending of clam which was moved cranial or caudal. This area was quite enough for extracting big sized hernias. Again X-ray control was done in order to be sure that the ending of clam reaches to the central part of hernia (Pic. 5).



Pic. 4. a – Nerve root compressed by hernia; b – the extraction of hernia is shown



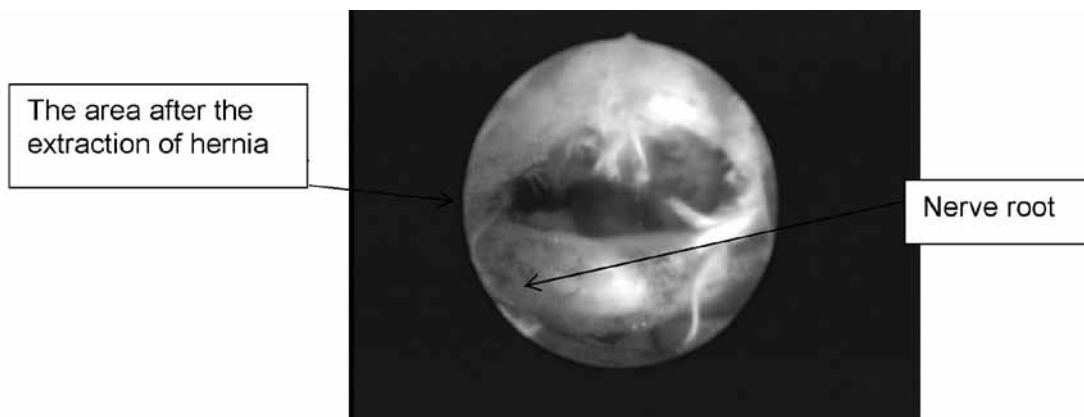
Pic. 5. Placed clam: a – lateral view; b – view by X-ray control

After the extraction of hernia and X-ray control endoscope was placed 1 cm deeper and nerve root lateral examination was done. After complete extraction of hernia on lateral and ventral sides of nerve root it has disappeared (Pic. 6).

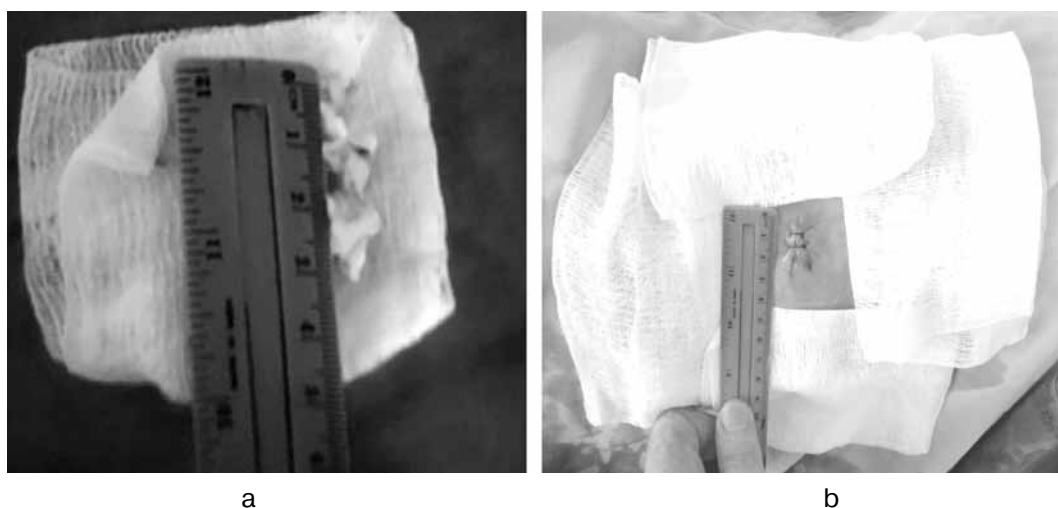
After the extraction of hernia the epidural area was washed with NaCl 0,9% liquor. After this the working tube was removed and was sewed (Pic. 7). The

կատարվում էր էպիդուրալ անեզիզացիա, որն էլ հետո հեռացվում էր. Երբ հեռացվում էր զանազան չափերի զննվողները, ապա կարելի է ասել, որ զննվողի չափը չէր լինում հեռացման համար կոնտրադիկացիոն (Pic. 7b).

12 hours later the patients were allowed walking. The next day of the operation they went home. The average duration of the operations was 1 hour.



Pic. 6. The endoscopic view of freed nerve from the compression of hernia



Pic. 7. a – The size of scar after the operation; b – big hernia extracted with endoscopic method

### Results

203 patients were operated on with endoscopic percutaneous method. In 182 (89,6%) the results were good. It means that after the operation neither medical treatment nor physiotherapy was needed. In 5 (2,5%) cases the results were enough. It means that after the operation both medical treatment and physiotherapy were needed. In 2 (1%) cases the results weren't effective so the results weren't sufficient. In 12 (5,9%) cases in early postoperative period the pain syndrome sharpen, which is conditioned redetsive (ռեցեդիվ) of intervertebral hernia. These patients were re-operated on. And then the results were good. In 2 (1%) cases in postoperative period inflammatory complication such spondilit and spondilodistsit were

developed, because of which patients received medical treatment for a long time.

### Conclusion

The method of back lateral endoscopic percutaneous transforaminal extraction of intervertebral hernia under X-ray control allows extracting hernia of different size and location. The appropriate knowledge allows doing it within an hour. After the operation lateral and ventral endoscopic examination of nerve root assures that the hernia was completely removed.

This method allows operating on without general anesthetization.

The good results of endoscopic percutaneous transforaminal method were 89,6%, which corresponds to the results of open surgery described in literature.

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