The Role of Steroid in Post Myelography Headache

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ABSTRACT

Myelography is a diagnostic procedure to indicate spinal defects. After the inception of new means of spinal cord imaging, use of myelography has been limited. Since there are contraindications for other modalities in some patients, we have to use myelography. The most common complication of myelography is post myelography headache (PMH). Many methods have been proposed to alleviate the pain. In this clinical trial study we assess the role of steroid in PMH.

Keywords: Myelography; Headache; Lumbar puncture; Steroid

INTRODUCTION

Myelography is a diagnostic method for detecting the pathologies of the spinal cord. This procedure is performed through injection of contrast medium into the subarachnoid space, followed by X-ray studies 1. In the modern era with the advent of new technology in the medical field specially different modalities such as computerized tomography (CT) and magnetic resonance imaging (MRI) the role of myelography in diagnosis has been limited. Nevertheless there are still conditions such as claustrophobia which make myelography inevitable for diagnosis. Patients with medical or biostimulation implants (e.g., pacemakers, implantable cardioverter-defibrillators, insulin pumps, cochlear implants) are generally not considered for MR scanning 2,3.

Aside from patients in whom MR imaging is not possible for safety reasons, other reasons for myelography include severe image quality degradation due to metallic artifacts (e.g., shrapnel injuries), financial limitations or in cases that kyphoscoliosis makes image acquisition and interpretation extremely difficult. However, there are still indications for myelography as an independent diagnostic tool like cases suspected of far lateral lumbar disk herniation, thoracic and cervical canal stenosis or spinal cysts. In these situations CT-myelography has more diagnostic validity compared to MRI 4.

Myelography is generally safe. Reviewing of the literature shows a vast spectrum of complications. The most common complication of myelography is spinal headache, which is reported to occur in 4-60% of procedures 5,6. It also has a low risk of seizure, allergic reactions, and other subtle complications 7. These complications may be attributed to the contrast agent which may be oil-based or water soluble 8.

Postmyelographic complications may be due to either CSF leakage or CNS irritation due to contrast material 11. Management of these complications is extremely different (supine or sitting position, respectively). The proposed treatments for post-myelo headache consist of rehydration or use of acetaminophen or other NSAIDs, opioids, antiemetics 12, DDVAP 13,14, ACTH 15, Caffeine 16. In resistant cases, epidural blood patch 17 or epidural saline 18,20 or dextran 21,22 injection are used as well as epidural, intrathecal and parenteral opioids 23,24,25. However, these
measures do not provide complete relief. The last resort is surgery. Very few studies have assessed the role of steroid in post myelography headache.

In this study we evaluated the therapeutic effects of steroid in alleviation of post myelography headaches. One of the most paramount features in our study is the classification of the degree of headache in to five stages. It is of great importance that the indication of myelography was lumbar radiculopathy in all of the cases.

MATERIAL AND METHODS

Sixty-five patients from February 2010 till February 2013 were considered for myelography in our clinic. All patients had low back pain with radicular pain in one leg or intermittent claudication. All the patients failed conservative treatment: at least two weeks bed rest with anti-inflammatory and palliative medications. Before the procedure, the patients were informed of the purpose of the study.

This procedure was performed with patient in the lateral decubitus position. At first we took 5–10 ml CSF for laboratory studies. Then, we injected Omnipaque (Iohexol) with a standard dosage of 10 milliliters and a concentration of 240 milligrams of iodine per milliliter. The rate of injection was slow. It lasted for 1-2 minutes. After myelography the patients were placed in a semi-recumbent position for six hours and confined to bed for 24 hours. The patients were divided into two groups. In this study start of the headache was not an indication for us to inject dexamethasone. The first group consisted of 37 patients in whom intravenous steroid (dexamethasone), 8 mg twice a day was prescribed. For the other 28 patients (second group) distilled water as placebo was used. We prescribed dexamethasone and distilled water before the headaches started. These patients were randomized into these groups using colored cards. Each patient picked up a card from a sack. The randomization process was double-blinded. We performed myelography with 26 gauge needle. The exclusion criteria in this study were as follows: congestive heart failure, coagulopathy, psychogenic problems like panic disorder, severe anxiety, and patient’s unwillingness to collaborate.

Patients were asked to describe their headaches. We graded the headaches from 0 to 4 as described in table 1. The frequency and severity of adverse reactions in the two groups were then compared. For analgesia we used diclofenac tablets. The number of required diclofenac tablets was also recorded and compared.

Demographic and pain score data were analyzed using Microsoft Excel software performed by a statistics’ expert. Assessment of the intervening factors was done using student’s t-test and χ² test. Based on the patients headache score they were divided into two groups (greater or equal grade 3 and lesser than grade 2) and was compared using χ² test.

RESULTS

Our series consist of 65 patients that were referred to us due to spinal complaints from February 2010 till February 2013. We performed myelography because of different reasons such as economic problems, claustrophobia, metallic foreign bodies, etc.

We randomized all our patients in to two groups. The first group received 8mg dexamethasone IV just before the performance of myelography. This group included 37 patients of whom 23 were male and 14 were female, M/F ratio was 1.64. The average age of this group was 41.45 years, ranging from 28 to 78 years with standard deviation of 11.91 years. Median age was 38 years and the mode was 32 years. The second group did not receive dexamethasone. They were 28 patients of whom 16 were male and 12 were female, M/F 1.33. The average age of this group was 39.5 years, ranging from 24 to 79 years with standard deviation of 17.14 years. In most of the cases the age was 30 and the median was 30.5. The symptoms of the patients according to the degree of headache, was summarized in table 1.

In the first group the major cause of myelography was economic problems, 18 patients (48.6%). The second most common cause was claustrophobia, 9 patients (24.3%). Six patients (16.2%) underwent myelography due to metallic foreign bodies. Two patients (5.4%) had morbid obesity and in 2 patients (5.4%) myelography was performed because lumbosacral MRI was inconclusive. Economic problems were also the major cause of myelography in the second group consisting of 15 patients (54%). The other cause was claustrophobia in 8 patients (29%). Four patients (14%) had metallic foreign bodies, and one patient (3%) had morbid obesity. Table 2 shows the statistical analysis of matching between our two groups.

The most common clinical complaint in the first

<table>
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<tr>
<th>Grade of headache</th>
<th>Symptoms</th>
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<tr>
<td>0</td>
<td>No headaches</td>
</tr>
<tr>
<td>1</td>
<td>Mild headache, no interference with daily activities</td>
</tr>
<tr>
<td>2</td>
<td>Moderate headache, some interference with daily activities</td>
</tr>
<tr>
<td>3</td>
<td>Severe headache, bedridden</td>
</tr>
<tr>
<td>4</td>
<td>Severe headache, requires hospitalization</td>
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</table>
group was persistent radicular pain (30 patients, 81.1%) followed by intermittent claudication (5 patients, 13.5%), and refractory axial back pain in 2 patients (5.4%). The most common clinical complaint in the second group was also persistent radicular pain, 19 patients (68%), followed by intermittent claudication in 9 patients (28%). In the first group 28 patients (75.7%) had sensory impairment and 25 patients (67.6%) had motor impairment. In the second group 19 patients (68%) had sensory impairment and 13 patients (46%) had motor impairment.

After performance of myelography we assessed the total amount of analgesic consumption. In the first group the average number of diclofenac tablet prescription was 3.45 ranging from 1 to 8 with standard deviation of 2.71. The median number was 2 tablets and in the most of the cases only 1 tablet was used. In the second group the average number of diclofenac tablet consumption was 5.85 ranging from 1 to 8 with standard deviation of 2.51. The mode was 7 tablets and the median was 7 tablets too.

In the first group the average degree of headache was 2, which ranged from 0 to 4. The standard deviation was 1.19. In most of the cases the degree of post myelography was 1 and the median was 1. In the second group the average degree of headache was 3, ranging from 0 to 4 and the standard deviation was 1.32. The median and mode were 3. Generally in our patients significant (grade $\geq 3$) PMH occurred in 50.1% of the patients.

We also assessed the duration of headache after myelography. In the first group, the average duration was 1.37 days, ranging from 0-4 with standard deviation of 1.5 days. The median duration was 1 and the mode was 0. In the second group the average duration was 4.9 days, ranging from 0-7 with standard deviation of 2.29 days. In most of the cases, duration of headache was 4 days and the median was 3 days.

DISCUSSION

Post dural puncture headache (PDPH) occurs after dural puncture for myelography, lumbar puncture, or spinal (subarachnoid) anesthesia \(^{30-33}\). The headache is positional; it is relieved by lying supine and exacerbated by sitting or standing \(^{30-32}\). It may be associated with nausea, vomiting, impairment of vision, tinnitus, or loss of hearing \(^{30,31}\).

CNS irritation is the major cause of symptoms that were reported after myelography with Metrizamide as a contrast agent and there is no difference in side effects between ambulatory patients and bed-rest patients \(^{11,34,35}\). The complications that have been reported with Iohexol (Omnipaque) are less than Metrizamide \(^{36-39}\). The almost fast disappearance of intrathecally injected Iohexol \(^{40}\) considering the duration of the symptoms and the effect of position on the severity of the headache, it seems that CSF leakage is more effective than the irritative effect of contrast agents on post-myelography symptoms \(^{41}\).

Water-soluble agents have less side-effects compared to conventional contrast agents. However, they are not without any morbidity. The risk involved in the process is considered acceptable in patients who suffer from radicular symptoms and objective signs who had not received conservative treatment.

We asked all the patients to remain on 30° head elevated supine position after myelography. According to Ilkka and Hans’s study \(^{41}\) it does not appear that the patient’s position after myelography significantly affects the rate of adverse post-myelography symptoms. PDPH treatment is determined based on the severity of symptoms. If the headache is mild, the treatment will be supportive. The patients were administrated to remain supine; acetaminophen, nonsteroidal analgesics and opioids are used to alleviate the pain.

The administration of Methylxanthine agents for patients who suffered from severe PDPH has been suggested \(^{30-32}\). It produces vasoconstriction especially in cerebral vessels \(^{30}\). Methylxanthine alleviates PDPH in 75%-85% of the patients \(^{31}\). Patients with mild to moderate PDPH might get prescribed Methylxanthine orally. However patients with severe PDPH may be given intravenous Methylxanthine \(^{30-32}\). This supportive treatment is continued until the dural defect heals itself.

If PDPH continues after at least 24 hours of supportive therapy, then treatment with an epidural blood patch is suggested \(^{30-32}\). The injection of autologous blood into the epidural space will immediately relieve the headache by means of closing the dural defect. Applying the first epidural blood patch is successful in 85%-90% of patients. Also less than 2% of patients have residual PDPH after a second epidural blood patch \(^{31}\).

### Table 2. Age, sex and economical cause of myelography in each group.

<table>
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<th>Steroid +</th>
<th>Steroid -</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Age (median)</td>
<td>41.45</td>
<td>39.5</td>
<td>0.675</td>
</tr>
<tr>
<td>Sex (M/F ratio)</td>
<td>1.64</td>
<td>1.33</td>
<td>0.4197</td>
</tr>
<tr>
<td>Economical cause of myelography</td>
<td>48.6%</td>
<td>54%</td>
<td>0.453</td>
</tr>
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In our review of the literature we didn’t find any article which was based on a grading scale for assessment of headache, except the study performed by Hess JH 32. Based on their grading scale the authors reported that after myelography severe headache occurred in 15% of their patients. However, in our study severe headache occurred in 50.1% of patients. This difference may be due to the pain threshold of patients and/or needle gauge.

One of the paramount advantages in our study was the similarity between our two groups which matched according to proofs summarized in (Table 2). Statistical analysis did not show any significant difference of the age and sex between the two groups (Table 2). Generally in our patients, significant (grade >=3) PMH occurred in 50.1% of patients. In the patients who received steroid severe PMH occurred in 37.8% where as in the other group it occurred in 75%. Statistical analysis showed that this difference was significant (p=0.026). In this study 49% of patients had 0-1 degree of headache, 35% were grade 2 and just 15% of patients had severe (more than grade 3) headache. In our study, the average of headache duration was 1.37 days in treated patients in contrast to 4.9 days in the other group and the difference between the two groups was statistically significant (p=0.0092).

Vandam and Dripps reported that 72% of PDPH resolved within 7 days, and 87% had resolved in 6 months 42. Hess JH in his series reported that PDPH in 90% of the cases began within 3 days of the procedure and the duration of PDPH was usually 3-5 days 32. Reynolds F. in his study confirmed these results 43. In Leibold RA study, 66% of PDPH started within the first 48 h 32. In few cases the headache began in 5 to 14 days after dural puncture, however, rarely it may present itself immediately after dural puncture 44. Our study showed that the total amount of analgesic consumption was statistically lower in cases with steroid injection (p=0.0094).

CONCLUSION

According to our study, it seems that using steroid after myelography is effective on the improvement of headache severity, duration, and need for analgesics.

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REFERENCES


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