Original Article

Percutaneous Vertebroplasty in Osteoporotic Vertebal Compression Fractures: Our initial experience
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Abstract

Objective: To see the safety and efficacy of Percutaneous vertebroplasty in osteoporotic vertebral compression fractures.

Methods: This study was conducted at the Department of Neurosurgery, Liaquat National Hospital (LNH) Karachi, Pakistan. Patients with osteoporotic compression vertebral fractures, not responding to conservative treatment and having localized overlying tenderness and MRI evidence of high signal in the involved vertebral body, were included in the study. Visual Analogue Scale was used to measure the intensity of pain. Percutaneous vertebroplasty (PVP) was performed by injecting polymethylacrylate in the diseased vertebral body. The patients were followed up for initially 4 and 24 hours. Later they had a check up at 2 weeks, one three, six and twelve months.

Results: Percutaneous vertebroplasty on twenty-four patients were included who underwent (LNH) from 2002 to 2006 Age range was from 65 to 85 years (mean age 75±3.3 years). Among 24 patients, 21 were females and 3 patients were male. Six patients had two levels osteoporotic compression vertebral fractures the rest, had compression at one level. Patients with radicular pain or signs of myelopathy, osteomyelitis of targeted vertebral body or overlying skin infection, severe compression of vertebral body or with retropulsed fragment into canal as evident by CT scan were excluded from the study. While patients who failed to respond to 6-12 weeks of conservative treatment, with localized overlying tenderness and MRI evident high signal in vertebral body involved, were included in the study. Visual analogue scale (VAS) was applied for the assessment of pain intensity. Follow-up was performed immediately, within 4 hours, after 24 hours, 2 weeks, 1 month, 3 months, 6 months and finally at one year.

Conclusion: Percutaneous vertebroplasty is a safe and useful procedure for the treatment of backache associated with osteoporotic vertebral compression fracture (JPMA 58:498;2008).

Introduction

Percutaneous vertebroplasty (PVP) is a therapeutic, interventional radiologic procedure that involves transpedicular injection of polymethylmethacrylate (PMMA) into a diseased vertebral body, commonly osteoporotic compression fractures, in an effort to relieve pain and provide stability. Osteoporotic compression fractures are an important public health concern, leading to significant morbidity, mortality and economic burden. Immobility due to fracture pain is a common cause of morbidity in this population, making these individuals at risk for pneumonia, deep vein thrombosis, and pulmonary embolism. In recent years Percutaneous Polymethylmethacrylate Vertebroplasty has become a common procedure for the treatment of pain and disability associated with osteoporotic vertebral compression fractures. The term vertebroplasty originally described an open surgical procedure that introduces bone graft or acrylic cement to mechanically augment weakened vertebral bodies.

The first image-guided percutaneous vertebral augmentation, or percutaneous vertebroplasty (PVP), was performed in France in 1984, and the first percutaneous vertebroplasty was performed in North America in 1993 and reported in 1997. Later on PVP techniques were further refined largely on the basis of predominant European3,4 and American2,5 experiences.

Commonly available bone cement is polymethylmethacrylate (PMMA) with its good safety record as it has been used for augmentation of weakened or partially destroyed bone in orthopaedics for decades; and cadaveric vertebral bodies has shown a significant increase in the load-bearing ability of PMMA-injected vertebral bodies compared with controls.

Percutaneous vertebroplasty is widely practiced in developed countries. This study shows the promising results of the procedure in Pakistan.

Patients and Methods

The study was conducted on 24 patients at the
neurosurgery department of LNH from 2002 to 2006 (after informed consent). Six patients had two levels osteoporotic compression vertebral fractures while the rest had involvement at one level. Vertebral bodies involved were from D8 to L3.

Preprocedural workup included 6 to 12 weeks of conservative treatment that consisted of bed rest, analgesic use, and physical therapy. All patients with radicular pain or signs of myelopathy, osteomyelitis of targeted vertebral body or overlying skin infection, severe compression of vertebral body or with retropulsed fragment into canal as evident by CT scan were excluded. The patients who failed to respond to conservative treatment, with localized overlying tenderness and MRI evidence of high signal in vertebral body involved, were included in the study. Two patients had vertebral compression fractures (VCFs) at L2 and L3 with diffuse paraspinal pain that was radiating to both hip joints. They had negative localizing tenderness but MRI showed high signals at fracture sites, were also included in the study. Plain x-rays, Magnetic resonance imaging (MRI) and CT scan in very selective cases were the imaging tools. A screening MRI protocol was adopted to see the high signals in involved vertebral bodies. Visual analogue scale (VAS) was applied for the assessment of pain intensity, where 0 means no pain and 100 means pain of highest intensity.

PVP technique was exactly the same as described in European and American literature.3-7 Under conscious sedation in prone position with vital signs monitoring, a unilateral pedicle was inserted with a trocar needle after localization with fluoroscopic guidance and proper instillation of local anaesthetic over the targeted pedicle. Three to ten ml of PMMA was injected and stopped if there was intradiscal, or epidural cement leakage. We did not perform vertebral venography, a procedure now no longer used.2 With 3-4 hour postoperative bed rest, patients were allowed to get out of bed, if the pain was diminished significantly. Prospective follow-up was performed within 4 hours, after 24 hours, 2 weeks, one month, 3 months, 6 months and finally at one year (range: 9 to 15 months).

Results

The age range of the 24 patients studied was 65-85 years with a mean age of 75±3.3 years. There were 20 (83%) females and 4 (17%) males. In majority of fractures (n=19) there was no known precipitating event, whereas in 5 patients fall was the cause of fractures.

Eighteen (75%) patients were treated at single level and 6 (25%) patients at 2 levels. Irrespective of the age, sex, region and number of levels treated, the volume of injected bone cement (PMMA), was divided into 3 groups according to their preoperative VAS pain score:

Group A- (13 patients): 78.48
Group B- (8 patients): 75.20
Group C- (3 patients): 72.45

The mean preoperative VAS score was 75.37±7.72

Postoperatively within 4 to 24 hours, mean VAS was 12.5±4.1 in Group A, 14.8±3.9 in Group B and 15±5.0 in Group C. So, overall mean postoperative VAS Score was 14.1±4.17 within first 24 hours, 11.16±3.76 at 2 weeks which further improved at follow up period (Table).

Two patients reported temporary radicular pain after the procedure, which was completely relieved with simple analgesics. One patient reported a worsening of the pain after procedure, with no obvious reason, but luckily he responded well to facet joint injection. Two patients presented with recurrence of pain at the same sites. With repeat vertebroplasty, the patients had an excellent pain relief. There was no infection, permanent neurologic injury and pulmonary embolism after the procedure.

### Table: Comparision of VAS scores before and after vertebroplasty.

<table>
<thead>
<tr>
<th>Group treated</th>
<th>Before vertebroplasty</th>
<th>Mean VAS score After vertebroplasty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-24hrs</td>
<td>2 weeks</td>
</tr>
<tr>
<td>A 13</td>
<td>78.48±3.15</td>
<td>12.5±4.1</td>
</tr>
<tr>
<td>B 8</td>
<td>75.20±12.7</td>
<td>14.8±3.9</td>
</tr>
<tr>
<td>C 3</td>
<td>72.45±2.52</td>
<td>15±5.0</td>
</tr>
<tr>
<td>Overall=</td>
<td>75.37±7.72</td>
<td>14.1±4.17</td>
</tr>
</tbody>
</table>

Mean±SD
Discusson

Overall pain relief in our case series on Visual Analogue Scale (preop-75.37±7.72; postop-7.84±2.92) was similar to other studies.2,4,8-13 Pain relief occurs irrespective of the volume of PMMA injected. This may indicate that either all the intraosseous pain receptors have not been burnt or the cement distribution was not sufficient to provide structural stability and thus repeat vertebroplasty has very good results as was in our two patients and the same is mentioned by Gaughen et al20 as well.

Single pedicle insertion provides adequate access and significant volume of PMMA can be injected if the needle tip is directed properly to the centre of the vertebral body. Therefore we did not use bipedicular approach except in two cases with repeat vertebroplasty where the other pedicle was used. Kim et al and Tohmeh et al also did not find any difference in clinical outcome between unipedicular and bipedicular approaches.14,21

Bone scan imaging may be helpful when considering vertebroplasty therapy for patients suffering from multiple vertebral compression fractures of uncertain age or in patients with non-localizing pain patterns.11 But in our cases, patients with non-localizing signs had still high signals at their fracture sites on MRI. This could be due to continuous acute on chronic microfractures in these non-healing fractures. Hence we did not need bone scanning.

The amount of cement required for good clinical outcome has never been systematically studied.22 Testing of cadaveric spines suggests that up to 8ml of cement is required to achieve biomechanical integrity.22 However, the risk of extraosseous extravasation of cement increases with increasing volumes of cement injected.23 We have injected 3 to 10ml safely with equally good results.

One patient among our series reported a worsening of pain after the procedure who responded well to facet joint injection. This may be due to the presence of double pathology i.e., vertebral compression fracture along with facet arthropathy; hence alleviation of the bone pain unmasks the pain associated with facet joint arthropathy.

Conclusion

Percutaneous vertebroplasty with PMMA is a safe and useful procedure for the treatment of backache associated with osteoporotic vertebral compression fracture. But for proper future implementation, we need a prospective, randomized, controlled trial comparing PCV with conservative management to verify its safety and effectiveness.

We tried to perform a randomized controlled study but most of the patients from conservative group preferred to switch over to the surgical group after few weeks or months of conservative management.

References

Seroconversion of children following natural measles infection and vaccination

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Abstract

Objective: To evaluate the relationship between measles virus (MV) antibodies (abs) in sera and breast milk of nursing mothers, their contributions in seroconversion of children (0 - 9 months) post vaccination, prevalence of prevaccination measles abs in sera of children brought for measles vaccination and seroconversion rate in vaccinees from nursing and lactating mothers. Also to determine the potency of vaccines available in Nigeria in relation to seroconversion.

Methods: One hundred and twenty pre- and post-vaccination sera and breast milk samples were collected from each nursing mother while corresponding number of finger prick pre- and post-vaccination sera samples were collected from children on filter papers. These were tested for mv abs using serological techniques.

Results: Eighty (20.0%) mothers had measles haemagglutination inhibition (HI) abs in sera and 88(27.2%) had mv HI abs in breast milk. Eight (2.0%) children who had prevaccination mv abs in sera came from mv ab negative mothers. Forty- four (37.0%) came back for post vaccination sera, sero-converted while 76(63.3%) gave low sero-conversion rate of 37.0%. Results showed that mv abs in sera or breast milk of mothers did not interfere with mv vaccination in children. The low sero-conversion rate obtained was due to low vaccine potency with titres ranging between (log10-10 - log10-2.5)TCID/per dose, besides non-specific antiviral substances exhibited virus neutralizing activity.

Conclusion: Poor sero-conversion due to loss of passive immunity arose from undernourishment while low ab titres came with natural infection. This suggested mv vaccination did not immunize following natural mv infection or any other previous immune status (JPMA 58:501;2008).

Introduction

National Programme on Immunization (NPI) formerly Expanded Programme on Immunization (EPI) was launched in 1979.1 Programme boasts routine vaccination coverage and long-term sustainability for immunizable childhood diseases by emphasizing National, State and Local Immunization Days (NIDs, SIDs and LIDs respectively). Coverage for vaccination of childhood preventable diseases improved.2

Measles is characterized by coryza, cough, conjunctivitis and specific exanthema and maculopapular eruption.3 Transmission is by inhalation of secretions from patients' respiratory tract during prodromal phase and rash.4 In tropics, 50% of children are infected before 6 years age and 80% - 90% at less than 20 years.5 Vaccination efficacy is high when appropriately utilized and vaccine is protective unlike in the past.6 Nigerian Government (FGN) and World Health Organisation (WHO) reported that single dose vaccine given at nine months age produced immunity in 80 - 85 % children.7

Immune development is either congenital or after vaccination or wild type of an infection. Poor immune response is due to poor storage of vaccines or improper vaccination.8 Adu et al.9 and Onoja et al.2 attributed low sero-conversion to potency of vaccines. The role of mother-to-child in sero-conversion is not documented. Children may derive abs from breast milk when sucking and in-utero.1 Wild mv infection causes mobilization of