

Gentamycin injection in disc space during lumbar discectomy (aiming to prevent post - operative discitis)

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Summary:

Background: Postoperative discitis is uncommon 4%, but it is the most disabling postoperative complication after lumbar discectomy.

Objective: To assess the effectiveness of intradiscal Gentamycin in prevention of lumbar discitis post operatively.

Patients and Methods: This is a prospective study involving 320 patients, who had lumbar discectomy. 140 patients (first group) from Jan. 2012 to Jan. 2013 were not had intradiscal gentamycin injection, while 180 patients (2nd group) From Jan 2013 to Jan 2014 (2nd group) had intradiscal injection of 80mg Gentamycin at the end of surgery and before closing up. Follow up was done 10 days to 6weeks after surgery by W.B.C count, ESR, C-reactive protein and clinical assessment.

Results: There were eight cases (6%) of postoperative discitis in the first group, while in the second group there was only one patient (0.5%) with postoperative discitis who had intradiscal injection of Gentamycin (0.5%).

Conclusions: Intradiscal Gentamycin injection during lumbar discectomy is effective in preventing of postoperative discitis.

Key Words: Lumbar discectomy, Discitis, Gentamycin, prevention.

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Introduction:

Post operative discitis (POD) is infection of the nucleus pulposus with secondary involvement of the cartilaginous end plate and occasionally vertebral body following lumbar discectomy. (1) The incidence of discitis after lumbar discectomy is (0.2%-4%) (2), it is one of the most disability causes of failed back syndrome. (3)

POD leads to a long standing and sometime a permanent morbidity (3).

The management of POD presents a challenging problem despite the use of numerous antibiotic (4), infection is usually due to microorganism originated from the patient, may be from the operation room environment including theater personal or direct implantation through surgical instrumentations.(5).

Staphylococcus aureus and Staphylococcus epidermidis is common skin organism which cause the vast majority of infection (5). There is some controversy as whether some cases of POD are an autoimmune process. (6) risk factor of POD include advanced age, obesity, immune suppression, diabetes mellitus and systemic infection or local infection at time of surgery (7), the interval from operation to onset of symptoms is about 3 days to one month in most cases of POD.(8)

MRI is the imaging of choice in evaluation of patients with recurrent clinical symptoms after disc surgery, it demonstrates the involvement of the disc space and vertebral body and can rule out paravertebral epidural spinal abscess. (9)

little is known about the features influence the delivery of antibiotics to the intervertebral disc which is one of the

largest a vascular structures in the body.(10) the transport of solute from intracellular space into the nucleus pulposus is primarily by passive diffusion, therefore transport of solutes is dependent on properties of solute itself and the permeability of the adjacent end plate and nucleus pulposus .(11)

The antibiotic charge has a major influence on its penetration, positively charged antibiotic like gentamycin and lincomycin can enter disc where negativity charged antibiotic penicillin and cephalosporin has limited or no penetration because of the mutually dependent charges.(12)

Patients and methods:

This is a cohort of 320 patients, from Jan.2012 to Jan. 2014, who were subjected to lumbar discectomy in private nursing home hospital-medical city.

The patients were divided into two groups, the first group involve 140 patients who were operated upon between Jan. 2012 to Jan. 2013, were not had intradiscal gentamycin injection.

The second group of 180 patients which operated upon from Jan.2013 to Jan.2014 had 80 mg gentamycin intradiscal injection at the end of surgery and before closing up and without suction.

Inclusion criteria include all patients of both gender and at any age with lumbar disc prolapsed L3-L4,L4-L5,L5-S1 diagnosed clinically and radiology (MRI) and indicated for surgery.

Exclusion criteria are second hand surgery, previous spine infection, and systemic infection at the time of surgery, immune compromised patients and the patients receiving gentamycin preoperatively.

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Libratory tests(CBP+ESR,C-reactive protein, blood culture, and GUE), plain X-ray, MRI lumbar spine were done postoperatively if history and examination was suggestion of discitis, including severe backache with back stiffness exacerbated by motion of spine, disturbing his or her sleep and severe limitation of lumbar spine and legs movements.

Surgery was done by the same standard conventional technique (lumbar discectomy), by the same surgeon and follow up from 3 months to 6 months.

Lumbar discectomy was do under general anesthesia in prone position, normotensive technique, gauze dissection of periosteum and paraspinal musceles, laminectomy was done by bone cutter and Rongeurs , with minimum bone removal and discectomy was done under strict sterile non touch technique using pituitary Rongeur , postoperative I.V broad spectrum antibiotic was given for three days followed oral antibiotic for seven days, stitches was removed on ten days with complete bed rest.

Results:

There were six male and three female, ranging in age from 20 years to 65 years, seven of them were smokers and two were non smokers.

Duration of lumbar disc prolapsed symptoms was six months to one year preoperatively, six of patients had left sciatica pain and three had right sciatica pain and two cases had bilateral sciatic pain.

Nine patients developed postoperative discitis (POD) out of 320 patients during follow-up of average of two years (3%).

Eight patients (6%) in the first group of 140 patients developed POD, while only one patient (0.5%) developed POD in the second group out of 180 patients.

L4-L5 discitis occurred in seven patients and L5-S1 discitis occurred in two patients.

Eight patients developed discitis 3-6 weeks postoperatively and only one patient developed discitis one week after surgery.

Four patients had high ESR (80%-110%mm/hr), positive C-reactive protein (more than 6.6ml/dl), normal WBC and no fever.

All patients presented with severe back pain with back stiffness, exacerbated by motion of spine and legs.

MRI was done showing hypo intensity in T1 and hyper intensity in T2 of disc space and vertebral end plate in all patients with POD.

All patients with POD were treated conservatively by immobilization, lumbar brace, analgesia, muscles relaxants, and IV broad spectrum antibiotic (3rd generation cephalosporin, metronidazole infusion and, rifampicin cap anti-TB) for 6 weeks or until ESR become normal (5-15mm/hr).

All patients improved on those managements and became pain free without surgical intervention after six months to one year.

Discussion:

Discitis is uncommon primary infection of the nucleus pulpous, may start in cartilaginous end plate and spread to disc and vertebral body. (13)

Discitis is considered to be a serious complication of lumbar disc surgery, the incidence of discitis after lumbar discectomy is (0.2%-4%). (2)

In this study it was 3% in all patients (320patients), 6% in the first group without intradiscal genyamycin injection and 0.5% in the second group using intradiscal gentamycin injection.

The surgeon usually operated in avascular structure and may leave behind pieces of degenerative disc, necrotic tissue and varying hematoma, all elements strongly predispose to an infection.

The Interval from the operation to onset of signs and symptoms is usually 3 days to 8 months. (8)

In current study 8 patients developed discitis (3-6) weeks postoperatively and one patient developed of postoperative discitis at one week after surgery.

Elevated ESR that never decreases after surgery is a strong indication of discitis. (15)

In all 9 patients with postoperative discitis in our series high ESR, positive C-reactive protein more than 6.6mm/dl.

Patients with POD complained of severe backache which is exacerbated by movements, paravertebral muscles spasm, and severe limitation of spine movements and sometime occupied by anxiety and depressions. (1, 6)

Plain X-ray of the lumbar spine was not helpful for early diagnosis (16) which agrees with this study.

MRI was found to be more valuable diagnostic method than CT- scan (17), MRI findings of decreased signal from disc and adjacent portion of vertebral bodies in T1 and increased signal in T2 may occur 2-3 days after the onset of symptoms. (18)

MRI also ruled out other causes of postoperative pain, (9) GADA enhancements is strongly suggestive of discitis. (18)

In this study MRI was done showing hypo intense of disc at T1, and hyper intense in T2 which is compatible with Boden SD et al study. (18)

Studies on penetration of positively charged gentamycin ,vancomycin and teicoplanin into nucleus pulpous of rabbits showed that they reached peak concentration at 2 hours and remained at peak level for at least 6 hours with adequate antimicrobial level against both gram positive and gram negative microorganism. (19, 20)

Reley et al. determined the qualitative distribution of negatively charged penicillin and positively charged gentamycin with rabbit's disc and found that gentamycin readily penetrated and was evenly distribution in the nucleus pulposus while negatively charged penicillin was made less intense. (20)

In this study using positively charged gentamycin has the same effect in penetrations and distributions that reduce the incidence of POD dramatically to only 0.5%.

Age,gender,smoking,diabetic,hypertensive,level and side of the disc prolapsed has no relation to development of POD. (21)

All postoperative discitis were treated conservatively with great improvements, and pain free 6 months to one year which agree with study done by Rebecca walters, Razin Rahmat et al . (20, 21, 22, 23)

Conclusions:

It is concluded that the use of intradiscal gentamycin injections in the cleared disc space is effective in preventing postoperative discitis.

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