Medical Ozone in Herniated Disc: A Promising Safe, Effective and Low Cost Treatment Option

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Introduction

- Back pain associated with herniated disc has become an important and increasing general health problem across the world.
- Conservative treatment including physiotherapy and Traditional open back surgery was the treatment methods for herniated disc since long in Bangladesh.
- Recently percutaneous procedures are taking important role to manage such type of patients.
- Among the percutaneous procedures the ozone disc nucleolysis is practised for disc herniation and discogenic pain in Bangladesh since 2010.
- We conducted two studies in last four years. The aim of the study was to observe efficacy, safety and cost effectiveness of ozone disc nucleolysis.

Methods:

Study 1:

Ninety patients were recruited in three groups for prospective study. Each group contains 30 patients. Group P received physiotherapy, Group S received surgery and Group I received ozone disc nucleolysis. We observed the clinical outcomes at one month, three months and six months' time points using Verbal rating scale and MacNab method.

Study 2 :

Two hundred patients were recruited for this prospective study. Fifty patients (Group A) received intradiscal injections of an oxygen-ozone mixture. The other one hundred fifty patients (Group B) received identical oxygen-ozone injections, followed by transforaminal triamcinolone in 0.25% Bupivacaine. Discography was noted for each case. All patients underwent follow-up at one week, one month and six months. Clinical outcome was assessed by applying the modified MacNab method and Verbal rating scale.

Results :

Study 1

Table 1 : Status of pain at different time points in Modified Macnab Scale

Time points	Group	Excellent, n (%)	Good, n (%)	Fair, n (%)	Poor, n (%)
1 Week	P (n=30)	3 (7.5)	10 (41.7)	13 (65)	4 (66.7)
	S (n=20)	15 (37.5)	8 (33.3)	5(25)	2 (33.3)
	I (n=30)	22 (55)	6 (25)	2 (10)	0 (0)
		^{2}=28.5, p=0.0001			
1 Month	P (n=30)	9 (19.6)	7 (41.2)	8 (44.4)	6 (66.7)
	S (n=30)	18 (39.1)	5 (29.4)	4 (22.2)	3 (33.3)
	I (n=30)	19 (41.3)	5 (29.4)	6 (33.3)	0 (0)
		^{2}=11.76, p=0.06			
6 Month	P (n=30)	6 (16.7)	11 (42.3)	7 (35)	6 (75)
	S (n=30)	16 (44.4)	7 (26.9)	5 (25)	2 (25)
	I(n=30)	14 (38.9)	8 (30.8)	8 (40)	0 (0)
		^{2}=13.37, p=0.038			

Excellent : No pain, No restriction of mobility; Good: Occasional non-radicular pain, relief of presenting symptoms & able to return to modified work; Fair: Some improved functional capacity, Still handicapped and/or unemployed; Poor: Continued objective symptoms of root involvement.

Table 2 : Status of pain at different time points in VRS

	VRS 0 (M±SD)	VRS 1 W (M±SD)	VRS 1 M (M±SD)	VRS 6 M (M±SD)
Group P	7.7±0.70	6.20±0.93	5.13±0.90	4.97±1.38
Group S	8.03±0.85	4.67±0.88	4.23±1.48	4.10±1.56
Group I	7.90±0.85	3.17±0.87	3.63±0.77	4.37±1.13
		*p values		
Group P vs Group S	0.33	0.0001	0.006	0.05
Group P vs Group I	1.00	0.0001	0.0001	0.28
Group S vs Group I	1.00	0.0001	0.11	1.00

**p values are calculated using one way analysis of varience*

Table 3: Treatment cost in six month

Group	Cost, Mean ± SD (USD)
Group P	712±123
Group S	1503±211
Group I	309±59

Study 2

Table 1: Status of pain at different time points in Modified Macnab Scale

Post Intervention Period	Group	Excellent, n (%)	Good, n (%)	Fair, n (%)	Poor, n (%)
1 Week	A (n=50)	10 (20)	25 (50)	10 (20)	5 (10)
	B (n=150)	75 (50)	70 (47)	5 (3)	0 (0)
		^{2}=36.9, p=0.0001			
1 Month	A (n=50)	14 (28)	21 (42)	14 (28)	1(2)
	B (n=150)	70 (47)	65 (43)	14 (9)	1(1)
		^{2}=13.13, p=0.004			
6 Month	A (n=50)	15 (30)	19 (38)	15 (30)	1(2)
	B (n=150)	72 (48)	60 (40)	17 (11)	1(1)
		^{2}=9.19, p=0.027			

Excellent : No pain, No restriction of mobility; Good: Occasional non-radicular pain, relief of presenting symptoms and able to return to modified work; Fair: Some improved functional capacity, Still handicapped and/or unemployed; Poor: Continued objective symptoms of root involvement.

Table 2 : Status of pain at different time points in VRS

Group (200)	Before intervention, Median (Range)	1 Weak, Median (Range)	1 Month, Median (Range)	6 Month, Median (Range)
Group A (50)	8 (7-9)	3 (3-7)	4 (3-7)	4 (37)
Group B (150)	8 (7-9)	2 (2-3)***	3 (3-4)**	3 (3-7)*

*** p<0.001, **p<0.01, * p<0.05 in Mann-Whitney Test

Conclusion:

Ozone disc nucleolysis and traditional open surgery show same outcome over physiotherapy in long term follow up but ozone disc nucleolysis shows better outcome over both surgery and physiotherapy in short tome follow up. Ozone disc nucleolysis is cost effective treatment method for disc herniation in Bangladesh.

Transforaminal triamcinolone and local anesthetic combined with intradiscal ozone provides clearly superior outcomes when compared to ozone therapy alone, irrespective of content or non-content disc herniation. Though clearly inferior to combination therapy, patients treated with ozone therapy alone did have "excellent" or "good" outcomes in greater than two-thirds of cases. In order to fully elucidate the contribution of ozone disc nucleolysis in the treatment of discogenic pain, further studies would be required comparing combination ozone therapy & transforaminal triamcinolone injection with transfotaminal triamcinolone injection alone.

Combined intradiscal ozone with transforaminal triamcinolone & bupivacaine is a superior modality to treat discogenic pain, when compared to ozone therapy alone.