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EDITORIAL

Physical Medicine and Rehabilitation Education – Past, Present and Future

* Syed Shakil-ur-Rehman ** Nasir Mansoor Sahibzada

Physical and rehabilitation medicine (PRM) is an important specialty in modern health care system, especially in the developed countries. The focus of the specialty revolves around achievement of maximum functional potential of patients with impairments and disabilities. It improves the quality of life of the patients as well as the care givers by decreasing their burden. Professionals working in physical medicine and rehabilitation deal the patients with disability to reduce the impact of their disease or disability on their daily life, to prevent avoidable complications and to minimize the effects of changing disability.[1] PRM is an excellent example of inter disciplinary and multi disciplinary team approach towards total patient care that goes beyond the hospital settings and helps them to re integrate back in the society. The specialty works as a collaborative team at tertiary care rehabilitation settings where physiatrists act as team leaders and managers to achieve specific goals. The PRM team include rehabilitation medicine physician, physical therapist, speech and language therapist, occupational therapist, psychologist, prosthetist and orthotist, Rehab nurses, Rehab engineers and social workers.

Rehabilitation medicine physicians, also called Physiatrists are medical doctors having post graduate qualification and specialty training in PMR. In Pakistan the highest qualification in PMR is fellowship of college of physicians and surgeons of Pakistan (FCPS). They specialize in disability management by diagnosing and treating medical conditions, physical assessment of the impairments and disabilities, setting of rehabilitation goals, and carrying out team meetings to get input from all members specialized in their respective fields to improve patients functional status and subsequent follow ups for achievement of goals. The numbers of Physiatrists is very small, only 50 for a population of 180 million. Majority of them are serving in the Armed forces. The Armed force institute of rehabilitation medicine (AFIRM) is a state of the art tertiary care rehabilitation institute with complete multidisciplinary rehabilitation services in the country.[2] The Master of sciences in pain medicine is offered by some universities is popular among rehab physicians as it helps in better management of pain both acute and chronic in patients with disabilities.[3] Recently second fellowship in Pain medicine has been started by CPSP and is another avenue for rehab physicians. Super specializations in fields like sports medicine, Rheumatological rehab, Neuro rehab, Cardiac rehab, Musculoskeletal rehab and Electrodiagnostics are required for the future growth of the specialty. Physical Therapy is another major profession involved in physical rehabilitation. The role of physical therapists is to asses and diagnose physical impairments and disabilities and manage with exercise, mobilization, manipulation and therapeutic modalities.[4] They work as autonomous professionals with direct access to the patients but in rehabilitation institutes they work as active team members in collaboration with other team members. Unlike rehab physicians they are in handsome numbers throughout the country working in clinics, hospitals, rehabilitation centers, special education centers, universities sports and fitness centers. The first physical therapy school was started in 1956 at Jinnah postgraduate medical entre Karachi with 2 years diploma course in physical therapy. The course was upgraded to 3 year B.Sc in 1961, 4 years BS in 2000, and 5 years doctor of physical therapy in 2008. Recently there has been an exponential increase in physical therapy institutes in the country and around 74 institutes are offering different physiotherapy programs in Pakistan including doctor of physical therapy, Masters of science in orthopedic manual physical therapy, neuromuscular physical therapy, cardio pulmonary physical therapy, and sports physical therapy. Recently some universities

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have started PhD programs in physical therapy and PhD in rehabilitation sciences. There is need for MS level and PhD specialized programs in community-based rehabilitation, cardiac rehabilitation and Neuro rehabilitation to promote rehabilitation research and development among physiotherapist in the country. The current mushrooming of physical therapy institutes shows the robust growth of the field but at the same time the question on quality of education offered, clinical skills and exposure and the expertise of the final products has to be ensured for its survival. Speech and language pathology (SLP) or Speech Therapy is also a key area of physical medicine and rehabilitation. They specializes in the evaluation and management of communication and swallowing disorders.[5] Their number is scarce and currently only few universities are offering PGD and MS level degree program in speech language pathology. Entry level bachelor as well as specialized programs in this area are needed to improve the quality and number of these professionals. Occupational therapy is the use of assessment and treatment to develop, recover, or maintain the training in activities of daily living and work skills of people with a physical, mental, or cognitive disabilities. Presently BS programs are offered by some universities but Masters Level qualification is needed in this area.[6] The Prosthetist and orthotist are professionals specializing in assessment, production, fitting, and training of artificial limbs and supports. Currently five institutes are offering BS level programs and doing a great job but MS and PhD level programs are required in future. The field of physical medicine and rehabilitation is emerging in Pakistan, We need to exploit the need for the field and build it on solid educational and evidence based practices. We need to ensure the quality controls in its education to avoid quacks to fill in the gaps. The future lies in improving curriculum by incorporating best practices, state of the art and regulated teaching institutes, good clinical exposure and post graduate educational opportunities along with tertiary care rehabilitation facilities for ideal patient care, training and research. Emphasis should be on strengthening team work with all the professionals involved for the single goal of patients functionality. Since, “The chain is as strong as its weakest link" so we need to identify the weaknesses in the team and improve them as a team because in rehabilitation "We rise and fall together"

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ORIGINAL ARTICLE

Effectiveness of Strength Training Program with and without Hamstring Stretching in Patients with Knee Osteoarthritis

Syeda Rida Fatma, Syed Shakil-ur-Rehman, Shakeel Ahmad, Arshad Nawaz Malik

ABSTRACT

Objective: To determine the outcome of strength training programme; with and without hamstring stretching in Patients with Knee Osteoarthritis.

Study Design: A Comparative experimental study.

Place and Duration of Study: This research study was conducted in department of physical therapy at National Institute of Rehabilitation Medicine (NIRM) Islamabad from 1st January to 31st July 2014.

Materials and Methods: A total of 40 patients were randomly selected and placed into two groups. The inclusion criteria were radiologically diagnosed patients of both genders for knee osteoarthritis of age ranges from 40 to 75 years. The isometric quadriceps strengthening exercise, hamstring stretching exercises and NSAIDS were applied in group A, while group B was treated with isometric quadriceps strengthening exercise and NSAIDS. Both the groups were treated for 6 weeks at 3 days per week and Visual Analog Scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and knee range of motion were used as assessment tools to assess pain, function, and mobility. The measurements were made at the baseline and at the completion of 6 weeks treatment program to obtain numbered data. The data was analyzed through SPSS-20 and paired t test was applied to assess the statistical significance outcomes at 95% level of significance.

Results: The results showed that the patients treated with isometric quadriceps strengthening exercises and hamstring stretching exercises combined with NSAIDS managed pain, function and mobility clinically and statistically more (p=0.011, p=0.021, p=0.001), as compared with group B treated with isometric quadriceps strengthening exercise and NSAIDs (p=0.931, p=0.814, p=0.742), in patients with knee osteoarthritis, as assessed by visual analog scale (VAS), WOMAC index and goniometry.

Conclusion: It is concluded that isometric quadriceps strengthening exercise, hamstring stretching exercises and NSAIDS will managed pain, function, and mobility more effectively as compared with isometric quadriceps strengthening exercise and NSAIDS in patients with osteoarthritis.

Keywords: *knee osteoarthritis, Isometric Quadriceps Strengthening Exercise, Hamstring Stretching Exercise, NSAIDs.*

Introduction

Osteoarthritis is a degenerative joint disease involving the degeneration of joint articular surfaces including cartilage and subchondral bone. It usually involves the large weight bearing joints more than small and non-weight bearing joints. Degeneration of Knee joint is a common and most occurring type of osteoarthritis.[1,2] The Joint pain, tenderness, stiffness, locking, effusion, osteophytes, muscle atrophy, ligamentous laxity, and deformities are common signs and symptoms associated with knee osteoarthritis. It is usually diagnosed by physical examination and confirmed by radiograph.[3,4] The prevalence of osteoarthritis is 1.9 million in Australia, 8 million in United Kingdom, and 27 million in USA, while approximately 250 million people have osteoarthritis of the knee globally, which is 3.6% of the world population.[5] The management of osteoarthritis is exercise therapy, lifestyle modification, analgesics, and joint replacement surgeries. Physical therapy is one of the key options for patients with knee OA by managing it with life style modification and exercises. The life style modifications involves weight reduction, avoid low sitting and the using of English seats in washrooms. [1,2] The exercises and manual therapy are commonly used for managing pain, muscle strengthening, endurance, and flexibility. While in advanced stages of Knee OA, where arthroplasty is recommended a comprehensive pre and post rehabilitation are usually followed.[6-10] This study was conducted on the patients with moderate and chronic stages Knee OA and conservative managed by physical therapy. The objective was to determine the outcome of strength training programme; with and without hamstring stretching in Patients with Knee Osteoarthritis.

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Materials and Methods

This Comparative experimental study was conducted

in department of physical therapy at National Institute of Rehabilitation Medicine (NIRM) Islamabad from 1st January to 31st July 2014. A total of 40 patients were conveniently selected and placed into two groups. The inclusion criteria were radiologically diagnosed patients of both genders for knee osteoarthritis of age ranges from 40 to 75 years. The isometric quadriceps strengthening exercise, hamstring stretching exercises and NSAIDS were applied in group A, while group B was treated with isometric quadriceps strengthening exercise and NSAIDS. Both the groups were treated for 6 weeks at 3 days per week and visual analog scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and knee range of motion were used as assessment tools to assess pain, function, and mobility. The measurements were made at the baseline and at the completion of 6 weeks treatment program to obtain numbered data. The data was analyzed through SPSS-20 and paired t test was applied to assess the statistical significance outcomes at 95% level of significance.

Results

All 40 patients from both the groups showed improvement but the patients treated with isometric quadriceps strengthening exercises and hamstring stretching exercises combined with NSAIDS managed pain, function and mobility clinically and statistically more significant (p=0.011, p=0.021, p=0.001), as compared with group B treated with isometric quadriceps strengthening exercise and NSAIDs (p=0.931, p=0.814, p=0.742), in patients with knee osteoarthritis, as assessed by visual analog scale (VAS), WOMAC index and goniometry. (Table-I)

Table I: Comparison of mean, standard deviation, and p-value between group-A and group-B (n=40)

Study variable	**Group-A** (treated with isometric quadriceps strengthening, hamstring stretching and NSAIDS) (n=20)			**Group B** (treated with isometric quadriceps strengthening , and NSAIDS) (n=20)		
	Mean	SD	p-value	Mean	SD	p-value
Pre VAS (total score 0-10)	6.5	0.525	0.011	6.7	0.62	0.931
Post VAS (total score 0-10)	3.2	0.456		4.5	0.54	
Pre WOMEC (total score 100)	25	0.603	0.021	26	0.769	0.814
Post WOMEC (total score 100)	65	0.701		42	0.699	
Pre knee ROM-flexion (total-135 degree)	120	0.651	0.001	119	0.931	0.742
Post knee ROM-flexion (total-135 degree)	129	0.785		125	0.865	

Discussion

The result showed improvements in all patients but the group A treated with isometric quadriceps muscle strengthening exercises, hamstring muscle stretching exercise and NSAIDs demonstrate clinically and statistically more significant results as compared with the other group of patients treated with isometric quadriceps muscle strengthening exercise and NSAIDs. Recent trials have shown that exercise therapy is an effective remedy for managing pain, disability and mobility in patients with knee osteoarthritis. The types of exercises therapy Flexibility, aerobics and resistance exercise training are recommended for patients with knee osteoarthritis.[11,12]

The aerobic exercises and resistance training improves the patient self-efficacy for stair climbing in patient with knee osteoarthritis.[13] The capacity of Physical activity improves with Exercise training by reducing pain and disability. Home based strengthening exercises program along with aerobic walking also improves pain and disability in patients with knee osteoarthritis.[14] Exercise therapy is also effective in managing pain in patients with osteoarthritis if applied long term 12 weeks and supervised.[15]

Conclusion

It is concluded that the outcomes of strength training programme combined with hamstring stretching exercises and NSAIDS are more effective in managing pain, function, and mobility, as compared with strength training programme and NSAIDs in patients with osteoarthritis.

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ORIGINAL ARTICLE

Comparison of Hypoglycemic Activity of Berberis Lycium Royle Stem Bark and Glimepiride in Type 2 Diabetes

Hina Aslam, Adnan Jehangir, Uzma Naeem

ABSTRACT

Objective: To compare the hypoglycemic activity of aqueous extract of stem bark of Berberis lycium Royle and glimepiride –a sulphonylurea in a type 2 diabetes mellitus induced male mice model.

Study Design: Randomized control trial.

Place and Duration of Study: This study was carried out in the animal house of National Institute of Health (NIH), Islamabad from 7th November 2013 till 21st January 2014.

Materials and Methods: Fifty albino Balb/C male mice were divided randomly into groups I-V (n=10). Group I served as normal control group. In rest of the forty mice from group II-V, type 2 diabetes mellitus was induced by administration of high fat diet (HFD) for two weeks followed by low dose (40 mg/kg) intra-peritoneal streptozotocin (STZ) injections for four consecutive days. Group II served as the disease control group, group III received the aqueous extract of stem bark of Berberis lycium Royle in dose of 50 mg/kg body wt. while group IV received the aqueous extract of stem bark of Berberis lycium Royle in dose of 100 mg/kg body wt. Group V was administered glimepiride in a dose of 2mg/kg body wt. herb extract and the drug was given orally once a day. Samples were taken at the end of five weeks for blood glucose and glycosylated hemoglobin (HbA1c %).

Results: The blood samples estimated for fasting blood glucose (FBG) and glycosylated hemoglobin (HbA1c %) levels showed that the aqueous extract of stem bark of Berberis lycium Royle in a high dose (100 mg/kg body wt.) showed the maximum lowering of FBG and HbA1c% levels followed by its low dose (50 mg/kg body wt.) Glimepiride also lowered the FBG and HbA1c% to normal limits but its extent was less than the aqueous extract of stem bark of Berberis lycium Royle.

Conclusion: The aqueous extract of stem bark of Berberis lycium Royle lowers the FBG and HbA1c levels in a type 2 diabetes induced male mice in a dose dependent manner.

Key words: *Berberis lycium Royle, Glimepiride, Streptozotocin, Type 2 Diabetes Mellitus Mellitus.*

Introduction

Diabetes mellitus once considered a single disease, is now known as a clinical syndrome[1] of multiple etiology, characterized by chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism resulting from defect in either insulin secretion, action or both.[2] Pharmaceutical companies have been working to discover the newer drugs to control it for quite long. Unfortunately; like the thorns are attached to roses, these drugs also bring with them some degree of adverse effects. Modern medicine has been famous for its efficient role in therapeutics but the side effects have always been an issue.[3] Currently the trends have started to shift more towards the natural products to combat the present increasing health issues.[4]

Berberis lycium Royle (family Berberidaceae) is a famous herb, known long for its medicinal value.[5] It is known as Barberry in English, Sumbloo in Urdu, Ziar largay in Pushto.[6] In Pakistan, it is abundantly found in Margalla Hills.[7] It is also distributed in northern areas such as Gilgit, Baltistan, Ghizer, Astor, Diamer and Swat, Khyber Pakhtunkhwa.[8] Berberis lycium Royle as an anti-diabetic agent has also been investigated. Studies have been conducted on its root, stem, leaves, fruit and root bark, in crude and extracted forms. Its stem bark has not been investigated for its glucose lowering property although the stem bark is readily available in local market and berberine is present in highest concentrations in roots followed by stem bark. The stem bark contains 4.2% alkaloids as compared to 5% in roots.[9] Berberine is known to possess a considerable anti-diabetic activity.[10] The anti-diabetic activity of Berberis lycium Royle has been compared with the current anti-diabetic agents like insulin, gliclazide, glibenclamide.[10,11] In the present study, aqueous extract of stem bark of the herb was selected and its blood glucose lowering properties were compared to another oral anti-diabetic drug; glimepiride.[10]

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Materials and Methods

A randomized controlled study was carried out in the animal house of National Institute of Health (NIH), Islamabad from 7th November 2013 till 21st January 2014. A total of fifty healthy male albino Balb/C mice, weighing 28-38g and aged between 6-8 weeks, having fasting blood glucose (FBG) levels not more than 110 mg/dl and HbA1c <6.0 were included in study. All mice were acclimatized for one week. Then they were randomly divided in five groups (group I-V), each group containing 10 mice (n=10). Group I (n=10) served as the normal control group. In rest of forty mice (group II-V), type 2 diabetes mellitus was induced by administration of high fat diet(HFD) for two weeks followed by low dose intra-peritoneal injection of streptozotocin (STZ), once daily for four consecutive days.[12,13] It was ensured to administer the freshly prepared STZ injections to mice. A persistent FBG level >250mg/dl was selected as the cut off point for the confirmation of diabetes.[14] Group II was the diabetes control group to which no drug or herb was given. Group III received 50 mg/kg body wt. (low dose) of aqueous extract of stem bark of Berberis lycium Royle while the group IV received 100 mg/kg body wt. (high dose) of aqueous extract of stem bark of Berberis lycium Royle. The group V received the drug; glimepiride 2 mg/kg body wt. The herb and the drugs were given orally once daily for five consecutive weeks. Mice were housed under the controlled conditions of room temperature 20+2o C, relative humidity 50%-70% and 12-h light-dark cycle. They were provided free access to water ad libitum. All mice received the care in accordance with the NIH guidelines. The stem bark of Berberis lycium Royle was collected from village Prang, Charsadda. It was identified by a botanist Ghulam Jillani at Herbarium section of Botany department, Peshawar University. It was then washed with water thoroughly and shade dried. It was grounded into a fine powder with the help of an electrical grinder and taken into a non-metallic jar. The bark powder was soaked in distilled water for 72 hours with periodic stirring. It was then filtered using Whatmann filter paper no 1.The filtrate was evaporated at 55 0C in a rotary evaporator at the research laboratory of Riphah Institute of Pharmaceutical Sciences (RIPS), Islamabad. The extract was obtained as a dark brown semi-solid sticky paste. It was stored in air tight glass bottles, protected from light and kept in refrigerator at 2-8 oC to be used throughout the experiment. The yield of aqueous extract of stem bark of Berberis lycium Royle with respect to the original dry plant material was about 25%.[15] Blood samples were taken at the mid-cycle i.e. week 5 for the confirmation of diabetes mellitus and the end of week 10 for final sampling. The 6-hr fasting blood samples were preferred as blood glucose levels vary widely together with food intake during a typical day.[16-18] Fasting blood glucose (FBG) levels were measured using glucose oxidase/ GOD POD method while glycosylated hemoglobin (HbA1C) of the mice were determined by cation exchange resin method.[19,20] Descriptive statistics were applied using one way ANOVA test on SPSS 20. The level of significance was pre-defined as <0.05 ($p<0.05$).

Results

The final blood sampling at the end of week 10 i.e. termination of study, showed the following results: Significant difference was observed between group II and III at the end of week 10 regarding the mean FBG levels determined by (457.3+19.6 vs. 87.2+1.8) $p<0.05$ and mean HbA1c% (9.8+0.5 vs. 4.7+0.1) $p<0.05$ as shown in figure 1 and 2. Thus it indicated that the low dose (50mg/kg body wt.) of aqueous extract of stem bark of Berberis lycium Royle significantly decreased the mean FBG and HbA1c levels in diabetic mice as compared to disease control group. Significant difference was observed between group II and IV at the end of week 10 in their mean FBG levels by Kit method (457.3+19.6 vs. 77.4+2.0) $p<0.05$ [table 8.7a] and the mean HbA1c% of group IV was statistically reduced (9.8+0.5 vs. 4.4+0.1) $p<0.05$ as shown in figure 1 and 2. Thus it indicated that the high dose (100mg/kg body wt.) of aqueous extract of stem bark of Berberis lycium Royle significantly decreased the mean FBG and HbA1c levels in diabetic mice as compared to disease control group. Significant reduction in the mean FBG (457.3+19.6vs.96.7+2.1) $p<0.05$ and HbA1c% levels (9.8+0.5vs.5.2+0.1) $p<0.05$ was observed in group V at the end of week 10 in comparison with group II (diabetes mellitus control group) as shown in figure 1 and 2.

Discussion

In this study, the hypoglycemic activity of stem bark of Berberis lycium Royle was observed and

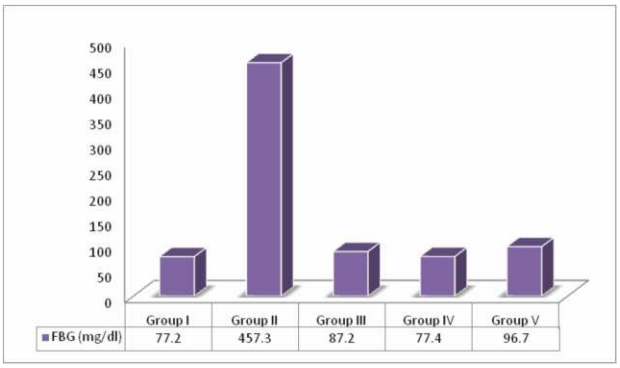

Fig 1: Effect of herb extract and drug on FBG levels of group I-V (N=50)

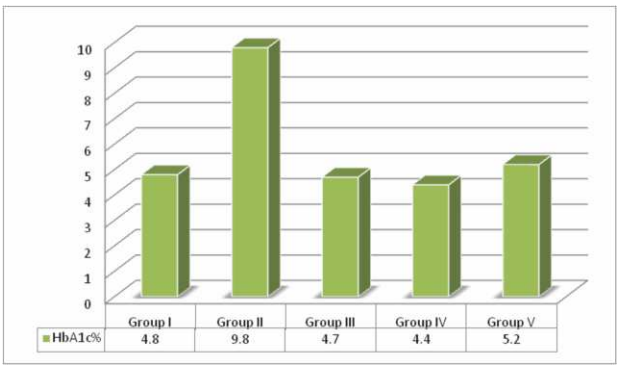

Fig 2: Effect of herb extract and herb on HbA1c levels of group I-V (N=50)

compared with glimepiride. The results indicated that the aqueous extract of stem bark of Berberis lycium Royle has a significant hypoglycemic effect ($p<0.05$), in a dose-dependent manner. FBG levels were lowest in the group receiving aqueous extract of Berberis lycium Royle stem bark at a dose of 100mg/kg body wt. ($p=0.00$) The levels were even lower than those of the normal control. However, statistically insignificant difference ($p>0.05$) was observed among the group III, IV, V in their FBG and HbA1c levels. These results correlate with the study carried by Gulfraz and Mahmood which showed hypoglycemic activity of methanolic extract of root of Berberis lycium Royle.[10] These results also correlate with the study done by Maqsood Ahmed which showed the glucose lowering ability of powdered root bark of Berberis lycium Royle and its extracts.[11] The other parameter of the study was the glycosylated hemoglobin (HbA1c) levels. The aqueous extract of Berberis lycium Royle stem bark also decreased the level of glycosylated hemoglobin (HbA1c%) in a dose dependent manner. High dose (100mg/kg body wt.) produced marked reduction in HbA1c level as followed by low dose (50mg/kg body wt.) ($p<0.05$) These results are in accordance with the work of Gulfraz and Mahmood on the extract of Berberis lycium Royle root.[10] Glimepiride also reduced the FBG and HbA1C% upto the normal levels but to a lesser extent then the herb stem extract. The glucose lowering effect of aqueous extract of stem bark of Berberis lycium Royle is probably due to presence of an alkaloid- berberine in stem.[21] A study by Yin J and co-workers in 2002 demonstrated the blood glucose lowering activity of berberine was similar to that of metformin.[22] Another study showed that berberine decreases blood glucose levels by increasing glucose transport by enhancement of GLUTs.[23] Berberine has also found to stimulate the activity of AMPK (AMP mediated protein kinase) by mitochondrial inhibition and thus enhancing the GLUT-4 and GLUT-1 translocations resulting in insulin independent mechanism of glucose consumption.[24] Further studies should be done to investigate the pharmacokinetic properties and drug interactions of the aqueous extract of stem bark of Berberis lycium Royle. So the desired effects produced by the herbal extract can be promptly achieved. Due to financial constraints, study could not be extended upto or beyond 12 weeks to further validate the HbA1c% levels.

Conclusion

The aqueous extract of stem bark of Berberis lycium Royle significantly lowered the fasting blood glucose and HbA1c levels in a diabetes mellitus type 2 induced male mice model in a dose dependent manner. The glucose lowering effects of the aqueous extract of stem bark of Berberis lycium Royle in type 2 diabetes mellitus induced male mice were comparable with the glucose lowering effects of glimepiride. Although the extent of the glucose lowering effects of extract was greater than glimepiride.

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ORIGINAL ARTICLE

Anatomical Variations of Sacral Hiatus in Dry Human Sacra

Shabana Ali, Imran Qureshi, Asad Ali

ABSTRACT

Objective: To observe anatomical variations of sacral hiatus in dry human sacra and its significance in caudal epidural block.

Study Design: An observational study.

Place and Duration of Study: The study was conducted at Islamic International Medical College Rawalpindi from July 2011 to January 2012.

Materials and Methods: We studied 191 dry human sacra without discrimination of sex, geographical and ethnic group consideration. The bones were examined for various shapes of the sacral hiatus and level of apex and base of the sacral hiatus. Sacral cornua and median crest was also observed. The sacral hiatus were divided into six groups. (Group I-inverted U, group II- inverted V, group III= irregular, group IV- M shape, group VI-dumbbell shape). SPSS 17 was used for the statistical analysis of the data.

Results: Out of 191 bones, inverted U shaped 76 (39%) and V shaped 56 (29%) sacral hiatus were most common and irregular 29 (15%) sacral hiatus was least common. Sacral cornua were prominent bilaterally in 83 (46.5%) bones while flat cornua were seen in 16 (9%). The apex of hiatus was lying against 4th sacral vertebra in 129(73%) bones while base of was present against 5th sacral segment in 183(91%) of cases.

Conclusion: The sacral hiatus has variations in shape. Inverted U shaped and inverted V shaped hiatus are most common shapes in dry human sacra. Sacral cornua are a reliable landmark in Caudal Epidural Block (CEB).

Key words: *Sacrum, Caudal Epidural Block, Variations, Hiatus.*

Introduction

Sacrum is formed by the fusion of five sacral vertebrae in the adult. It is wedged between the two iliac bones forming the concave posterosuperior wall of the pelvic cavity.[1] On posterior surface, there are special markings which represent the fusions of various components of sacral vertebrae. The median sacral crest is formed by fusion of spinous processes.[2] The area between the median sacral crest and dorsal sacral foramina is formed by the fused laminae while laterally fused articular processes form intermediate sacral crest. Lateral to dorsal sacral foramina is a lateral sacral crest, which is formed by the fused transverse processes.[3] Inferiorly, incomplete fusion of laminae of 5th sacral vertebrae leads to formation of an opening on posterior surface in midline: sacral hiatus. This failure of fusion may extend up to the 2nd sacral vertebra.[4, 5, 6] The fifth inferior articular processes project caudally and flank the sacral hiatus as sacral cornua. The sacral canal contains the cauda equina including filum terminale and the spinal meninges.[7] The subarachnoid and subdural spaces usually cease near second sacral vertebrae while epidural space persists below the S2 level.[8] The sacral hiatus contains fifth sacral coccygeal nerve roots, filum terminale externa and fibro fatty tissue. It is used in caudal epidural block (CEB) to approach the sacral and coccygeal nerves. This block is often employed to relax the perineal musculature for painless childbirth as well as anal, perineal, urological, gynaecological and obstetric operations that do not involve the anterior abdominal wall.[9] The reliability, success and safety of caudal epidural block depend upon the ability to locate the hiatus and to define its anatomical variations. The key to success in any regional anesthesia is a sound and updated knowledge of anatomy of that region, Only the complete knowledge variations in sacral hiatus can reduce the failure rate [10,11] as 3 % failure in caudal epidural block has been attributed to agenesis of the sacral hiatus.[12] Various shapes of sacral hiatus have been reported in literature. As possible variations exist among different population, a study was designed to observe the anatomical variations in the human dry sacral bones.

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Materials and Methods

The study was conducted at Department of Anatomy, Islamic International Medical College Rawalpindi from July 2011 to January 2012. Dry human sacra were studied in medical colleges of

Rawalpindi and Peshawar (Khyber Medical College & Peshawar Medical College). We studied 201 dry human sacra without discrimination of sex, geographical and ethnic group consideration. All complete bones were included while 1 bone with hiatal agenesis and 9 bones with open dorsal wall were excluded.

Following parameters of each sacrum were studied:

1. Shape of the sacral hiatus
2. Level of Apex the sacral hiatus
3. Level of base of the sacral hiatus
4. Bilateral prominent (> 3mm in diameter) or flat sacral cornua

The possible shapes of sacral hiatus were divided into six groups. Each bone was observed separately for level of base and apex of sacral hiatus. Bones were grouped on the basis of their shapes.

Group I= Inverted U shape,
Group II=Inverted V shape,
Group III= Irregular shape,
Group IV= M shape,
Group V= Dumbbell shape

SPSS 17 was used for the statistical analysis of the data, while Microsoft Word 2007 and Microsoft Excel 2007 were used to generate graphs and tables.

Table I: The frequency distribution of the levels of apex and base in all shapes of sacral hiatus (n= 191)

Group I= Inverted U shape, Group II=Inverted V shape, Group III= Irregular shape, Group IV= M shape, Group V= Dumbbell shape

	Vertebral Level	Shapes of sacral hiatus				
		Group I	Group II	Group III	Group VI	Group V
		75 (39%)	56 (29%)	29 (15%)	15 (8%)	16 (9%)
Level of apex of sacral hiatus	S2 2 (1%)	1	0	0	0	1
	S3 46 (24%)	17	19	4	5	1
	S4 129 (73%)	55	35	25	10	14
	S5 4 (2%)	2	2	0	0	0
Level of base of sacral hiatus	S5 183 (96%)	72	53	28	14	16
	Coccyx 8(4%)	3	3	1	1	0
Flat sacral cornua	18 (9%)	3	5	6	-	4
Bilateral prominent cornua	89 (46.5%)	24	33	7	11	14
Prominent median crest	20 (10%)	5	6	5	-	4
Flat median crest	10 (5%)	2	4	3	1	-

Results

Out of 191 bones, inverted U shape 76(39%) and inverted V shape 56 (29%) sacral hiatus were most common. There were 29(15%) irregular, 16(9%) dumbbell shape and 15 (8%) M shaped sacral hiatus. The level of the apex was quite variable and extended between the middle of 2nd to the middle of 5th sacral segments. Out of 191, 139 (73%) sacra had the apex against the 4th sacral vertebra. Long sacral hiatus was observed with the apex against 2nd and 3rd sacral segments in 2(1%) and 46 (24%) specimens respectively. Small hiatus was also found in 4 (2%) bones with the apex against 5th sacral segment. Base of sacral hiatus was present between middle of 5th sacral segment to middle of 1st piece of coccyx. Out of 191 sacra, the base of the sacral hiatus was most commonly present against the 5th sacral segment 183(96%), while only 8(4%) had it base lying against the coccyx. Sacral cornua were prominent bilaterally in 89(46.5%) while 18(9%) bones had flat cornua. Median crest was prominent in only 20(10%) bones.

Discussion

Sacral hiatus is an important landmark for a successful caudal epidural block. [13] CEB The needle is passed through hiatus to reach the caudal spinal canal.[14] There is an increased awareness of adverse effects related to the technique and placement of the local anesthetic in the canal. In adults, anatomical variations in hiatus make it technically difficult to perform CEB and may be the cause of failure.[10,15,16] In the present study, sacral hiatus was absent in one bone only (0.5%), similar results are reported by Sekiguchi et al[17] 0.7% and Aggarwal A[18] 0.5%. Complete agenesis of dorsal wall was found in 4.5% of cases which does not match the findings of Sekiguchi et al[17] 1%, Nagar[19] 1.5% and Parashuram R[20] 2 %. Among the five possible shapes, inverted U (39%) and inverted V (29%) shape were the most common shapes. These results were similar to Nagar[19] 41.5% and 27% for inverted- U and V shape sacral hiatus. These two shapes normally provide enough room for introducing needle into sacral canal. The distribution of other shapes was different from other studies which may be due to racial difference.[18] In 9% bones dumbbell shaped hiatus was observed which is similar to Kumar V[21] 7.43% but differs from 2% in Parashuram R[20] study. In 8% bones,

outline of hiatus was M-shaped while Aggarwal A[18] observed this shape in 0.88% bones. The sacral hiatus was irregular in 15% bones which is similar to Parashuram R[20] 15.5% and Nagar[19] 14.1%. Apex of sacral hiatus lies usually at S4 level. A higher apex requires precaution while passing needle through sacral canal. In our study, the apex was lying against S4 in 73% bones which matches with results of Parashuram R[20] 72.2% although Aggarwal A[18] study reported 68.42%. In 24% bones, the apex was found at S3 level, similar results were reported by Parashuram R[20] 20% , but Nagar[19] and Kumar V[21] has reported 37% , 8.9% respectively. There were only 2% bones that had very small hiatus: apex lying against S5 but Parashuram R[20] has reported 6.7% sacra with small hiatus. In small hiatus there is a small space for needle insertion. Sacral hiatus till S2 was observed in 1% bones, which is closer to the study reported by Aggarwal A[18] 2.6% and Nagar[19] 3.4%. Base of sacral hiatus was seen at S5 vertebral level in 96% specimen but Aggarwal A[18] found it in 61% and Nagar[19] in 72.6%. The base of sacral hiatus was at coccyx in 4% bones, it did not match Aggarwal A[18] and Nagar [19] study who found it in 27% and 16% bones respectively. Sacral cornua are the most commonly used landmark to identify sacral hiatus before CEB. Sacral cornua are either palpable bony tubercles or flat. Prominent bony cornua (>3mm) can easily be palpated even when covered by skin and subcutaneous fat. In our study, sacral cornua were prominent in 46.5% bones and still higher ratio (55.26%) is reported by Aggarwal A[18] but Sekiguchi et al[17] reported 21%. Bilaterally flat cornua were found in 9 % bones in contrast to 21.05%, 50% reported by Aggarwal A[18] and Sekiguchi et al[17] respectively. Therefore sacral cornua are reliable landmarks in our population. Median crest may be an additional bony landmark for locating sacral hiatus. In our study, median crest was prominent in 10% bones while inconspicuous crest was found in 5% of sacra which is closer to 3.55 % observed by Aggarwal A.[18] Therefore we cannot trust median crest

Conclusion

The sacral hiatus has variations in shape. Inverted U shaped and inverted V shaped hiatus are most common shapes in dry human sacra. Sacral cornua are a reliable landmark in Caudal Epidural Block (CEB).

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ORIGINAL ARTICLE

Evaluation of Reasons for Patients' Visits to Non Qualified Dental Practitioners and Level of Malpractice Causing Complications

Kanwal Sohail, Bilal Ahmed, Humna Munir

ABSTRACT

Objective: To find out the reasons for patients preference to get treatment from non-qualified dental practitioners along with the level of malpractice by such practitioners and resultant complications.

Study Design: A descriptive cross-sectional study.

Place and Duration of Study: This study was conducted in the prosthodontics department of Islamic International Dental Hospital and includes the data from a two months period from 1st March to 30th April 2014.

Materials and Methods: Our study is based on a questionnaire survey from patients who visited the department of prosthodontics of a teaching dental hospital. Our sample size was 25 patients who were included by convenient sampling. The collected data was analysed by using Microsoft Excel 2013.

Results: The demographic results come out to be 72% males and 28% females who have become the victim of dental mal practice. Sixty four percent of the patients reported that the most common cause of visiting a non-qualified dental personnel was that they are unaware of a proper dentist. Secondly, they lacked access to a proper dentist or they had an easy access to a non-qualified dental practitioner in their locality (36%). Financial considerations were found to be the main factor as most of these families belonged to a low socioeconomic status. These results depict variations in the sources of information and clinical patterns of treatment outcomes.

Conclusion: Our study highlights that lack of awareness on behalf of patients to identify qualified dentists, low socioeconomic status and easy accessibility to non-qualified dental practitioner are the main reasons for the patients inclination to get treatment from non qualified dental practitioner. The resultant malpractice especially the self cure dentures, leads to complications which are not normally encountered with recognized treatment protocols in dental practice.

Keywords: *Accessibility, Complications, Malpractice, Non-qualified Dentists.*

Introduction

According to FDI (Foreign Direct Investment) fact sheet, around 40,000 un-licensed dental health providers are working in Pakistan.[1,2] In a study Benzian reported that there were three times more un-licensed dental health providers than the fully qualified dentists in Morocco.[3] Regarding the demographic trends of patients, Mirza A. established that among the patients visiting these non-qualified practitioners, 53% were males and 47% were females. Moreover, the study also documented that only 69% were aware of the difference between a qualified and non-qualified dental health provider.[4] People approach the un- licensed practitioners due to a variety of reasons including illiteracy, poor accessibility, increased population, high cost of treatment and low social and economic status.[1] In 2003, Naidu conducted a study in Trinidad which proposed that, the two main reasons for visiting a quack were low cost (53%) and easy access (20%).[5] In another study Nils Rene claimed that Prosthodontics was the most commonly involved department in dental mal-practice in Sweden.[6] Keeping in view the importance of addressing the issue of mal-practice in prosthodontics, this article only discusses the patients having prosthetic treatment done by non-qualified persons and it emphasizes on bridging the gap between the dentist and the population to avoid malpractice. Many studies have raised this issue of dental malpractice but society has failed to eradicate this problem by educating the masses. The aim of this study was to find out the reasons for patients preference to get treatment from non-qualified dental practitioners along with the level of mal-practice and to mention the complications associated with the faulty prosthesis, in order to create awareness in general population, to eradicate the causative factors and to improve the quality of dental health practice. Our study emphasizes on the fact that as responsible dentists, we should provide our health services to people living in remote areas and to those having low socio-economic status.[7]

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Materials and Methods

It was a cross-sectional study based on a 9-term questionnaire including questions regarding the personal profile, complains with the prosthesis and causative factors of visiting a non-qualified dental practitioner. The questionnaire was approved by subject expert panel. The study was conducted in prosthodontics department of Islamic international dental hospital from the 1st March to 30th April 2014. Our sample size was 25 patients which were included using the convenient sampling technique. For the data collection patients visiting the department of prosthodontics were interviewed according to the designed questionnaire. The patients with complaints of dental mal-practice in prosthodontics restorations were included in our study while patients who have experienced mal practice in restorations other than prosthodontics were excluded. Collected data was analysed by using Microsoft Excel 2013 and descriptive statistics were applied for data analysis.

Results

According to our survey done by the help of the questionnaire, the demographic results come out to be 72% males and 28% females who have become the victim of dental mal practice. Age wise distribution reveals 36% patients from age 30-50 years, 56% from age 50-70 years and 8% from age 71-90 years underwent treatment by the nonqualified dental personnel. There are certain strong causative factors which restricted the patients from getting a better treatment from a dentist. The lack of awareness on behalf of patients to identify a proper dentist (64%), along with easy accessibility to a non-qualified dental practitioner (36%) were the main reasons for the patients to opt for treatment by non-qualified dental practitioner (Table I). Financial considerations were also found to be the main factors as most of these families belong to a low socioeconomic status. Most of the prostheses made by the non-qualified dental practitioners were self-cure fixed dentures which were 72%, 8% were the dentures fixed by wires and 20% were dentures with suction disks (Table II). Addressing the complications of these faulty prostheses, 36% of patients suffered from pain, gingivitis 28%, mobile teeth adjacent to the dentures 20%, periodontitis, ulceration and bone resorption were 4% each, 8% patients were unable to eat and 8% had complication of sinus tract, 12% had complained of infection, 24% complained of halitosis and 80% reported poor oral hygiene (Table III).

Table I: Causative factors of visiting non-qualified dental personnel

Causative factors	No of patients	Percentages%
Unawareness	16	64%
Access issue	9	36%

Table II: Types of Prostheses made as result of mal practice

Types of prosthesis	No of patients	Percentage%
Self cure denture	18	72%
Denture fixed by wires	2	8%
CD with suction disk	5	20%

Table III: Frequency of Complications of Wearing Faulty Prosthesis

Complications	No of patients	Percentages %
Pain	9	36%
Gingivitis	7	28%
Mobile tooth	5	20%
Ulceration	1	4%
Sinus tract	2	8%
Periodontitis	1	4%
Infection	3	12%
Unable to eat	2	8%
Bone Resorption	1	4%
Halitosis	6	24%
Poor oral hygiene	20	80%

Discussion

Currently Pakistan is having only one dentist for every 200,000 people, while according to the WHO, Pakistan should have one dentist for every 20,000. This gap has created many issues for the dentist community as the unlicensed practitioners have increased and it has become difficult to maintain the reputation of the profession.[1] This lack of qualified dentists has flourished the work of unqualified dental personnel. Based on this fact our current

study showed 18 male and 7 female patients who fell prey for the non-qualified dental practitioners after which they visited the tertiary care hospital to address their complications. Age wise distribution of the patients reveals 56% patients from 50-70 years of age. Most of the patients due to their desire for fixed prostheses visited the non-qualified dental personnel and for that matter self-cure fixed denture is a common practice. There are certain causative factors which deprive a particular population from receiving a quality dental treatment. Financial issues are the most important causative factors as a population of low socioeconomic status and low literacy rate becomes a target of such malpractice. According to this survey all patients having low socioeconomic status had financial problems, apart from that 64% were unaware about the difference between a qualified dentist and an unqualified dental personnel. They were also not aware of the proper treatment protocols which lead them to such substandard treatments. 36% of these subjects had no access to a qualified dentist and yet had easy access to a non-qualified dental personnel. This study also reinforced the conclusions of a similar study conducted in Pakistan revealing the low socio-economic status (66%) to be the main cause, following the un-availability of health centres (10%).[4] Out of total prostheses reported, 72% were self-cure dentures while 20% were dentures fabricated with suction disks and 8% were dentures attached with wires. Some patients had filling of the midline diastema with artificial teeth retained with self-cure acrylic.[8] Barriers to dental visit are linked to personal and environmental factors.[9] Most of these subjects were referred by their family and friends either to save money or the simple fact of knowing the person. Tremendous results were gathered related to the associated complications. The unsuspecting patients hoping to get their dental problems done by a quick and easy remedy often ends up with botched procedures that are not only painful but also destructive.[10] Almost in all patients, the oral hygiene got worse. Pain, gingivitis, periodontitis, ulceration, infection, damage to the adjacent teeth and halitosis were some of the complications which needed immediate care. However the satisfaction level of the patients was disappointing for the researchers as they were satisfied with their prostheses but many other parameters affected this satisfaction level. It is difficult to address all the aspects of mal practice in one study. Unqualified persons working as dentists are not substitutes for qualified dentists.[10] This was a very critical situation which needed to be properly addressed. There was found a need to explore the public health, legal, professional, socio economical and ethical dimensions of this problem.[11]

Conclusion

Our study highlights that lack of awareness on behalf of patients to identify qualified dentists, low socioeconomic status and easy accessibility to non-qualified dental practitioner are the main reasons for the patients inclination to get treatment from non qualified dental practitioner. The resultant malpractice especially the self cure dentures, leads to complications which are not normally encountered with recognized treatment protocols in dental practice. The complications such as pain, ulceration and infection adds to the misery of the patients. The gap between the population and the dentists needs to be filled. This situation should be of great concern as it damages the individual health and the public's trust in dental profession.[12] It is pertinent to set up a judicial body which controls such mal practice.[13] The government should urge the fresh graduates to practice in rural areas and provide more incentives to them.[14] Dentist should devote more time to community oriented oral health programs to increase the awareness among the population. The dental practitioners must adhere to the ethical principles and acceptable standards of patient care.[15]

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ORIGINAL ARTICLE

Preventive Effects of Sesame Seeds on Hyperglycemia and Serum Lipids in Fructose fed Mice

Maria Sarfraz, Nurain Baig Mughal, Amena Rahim

ABSTRACT

Objective: The aim of the study was to determine the effects of sesame seeds on anthropometric measurements (height, weight and body mass index), blood glucose, lipid profile and liver function tests in high fructose diet (HFD) fed mice.

Study Design: A randomized experimental laboratory trial.

Place and Duration of Study: The study was conducted at National Institute of Health Sciences, Islamabad from 1st February 2013 till 31st January 2014.

Materials and Methods: We allocated 30 female Balb/c mice into three groups. Control Group I (n=10) mice who were fed with standard laboratory diet were compared with Experimental groups; Group IIa (n=10) mice were fed on high fructose diet (HFD) for 08 weeks, Group IIb: (n=10) mice were fed with HFD plus sesame meal for 08 weeks. Anthropometric measurements (Weight, Height and BMI) and serum lipid profile, liver function tests and blood glucose were measured at baseline and after 8 weeks.

Results: The mean weight of the Balb/c mice was 23.33±1.44 grams, the mean height was 8.45±0.314 cm and the mean BMI was 3.27±0.33. The anthropometric measurement of the three groups of mice was similar at the baseline. After 8 weeks there was significant weight gain in the HFD group (IIa) 35.9±4.5 and HFD plus Sesame diet group (IIb) 30±4.5 as compared to control group 29.1±2.84. However the weight gain in HFD plus Sesame diet group (IIb) was significantly lesser as compared to the HFD alone group, signifying that perhaps sesame seeds prevented the significant weight. The mice that were fed on HFD (IIa) had significant derangement of their liver function tests, lipid profile and blood glucose as compared to control and HFD plus Sesame diet group (IIb).

Conclusion: High fructose diet results in significant weight gain, elevation of liver function tests, derangement of lipid profile and hyperglycemia. Sesame diet was effective in preventing these anthropometric and biochemical derangements. Hence it is likely that sesame diet has a hepato-protective role which needs to be confirmed by studies on a larger scale to demonstrate this hepatoprotective effect of sesame seeds beyond doubt.

Key words: *Fructose, High fructose diet, Sesame seeds, Hepatotoxitiy, Dyslipidemia.*

Introduction

Diabetes is the most common endocrine disorder and, it is estimated that more than 200 million people worldwide have diabetes mellitus and 300 million will subsequently have the disease by 2025. The new millennium has witnessed the emergence of a modern epidemic, the metabolic syndrome, with frightful consequences to the health of humans' worldwide.[1] The sole reason for this growing increase is excessive consumption of sweeteners. Caloric sweetener are in >95% of cakes/cookies/pies, granola/protein/energy bars, ready-to-eat cereals, sweet snacks, and sugar-sweetened beverages. Corn syrup, cane sugar and fruit juices are the common sweetening agents. These sweeteners contain high fructose content.[2]

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Fructose is a six carbon containing sugar present in juices, raisins, fruits, dates, cereals, beverages, corn syrup, soft drinks, cereals and bread. It is used as a nutritional supplement as well as sweetening agent. Studies investigating the effects of fructose consumption in humans and animals have been comprehensively reviewed strong evidence exists that consumption of diets high in fructose results in increased de novo lipogenesis (DNL), dyslipidemia, insulin resistance, and obesity in animals.[3-6] The potential role for dietary fibre in diabetes was first promoted more than 30 years ago by Trowell on the basis of his experience in East Africa where he noted a virtual absence of what is now known as Type 2 diabetes in association with the consumption of traditional diets, which were extremely high in 'lightly processed' cereal foods.[7]

Sesamin, a lignan occurring exclusively in sesame seeds and sesame oil, exerts diverse physiologically desirable functions. Although the mechanisms underlying the beneficial effects are not fully understood, sesamin specifically interferes with Δ5 desaturation of dihomo-γ-linolenic acid to

arachidonic acid, suppresses carcinogen-induced mammary tumori-genesis, induces liver microsomal and peroxisomal drug-metabolizing enzyme systems, and has a hypocholesterolemic effect.[8,9] In this study, we aimed to investigate the hepatoprotective effect of sesame seed on fructose fed mice.

Materials and Methods

This Randomized Controlled trial was carried out at National Institute of Health Sciences, Islamabad from 1st February 2013 till 31st January 2014 (1-Year). 30 laboratory bred Healthy, Balb/c strain mice of female sex aging between eight to ten weeks old were selected for study and were acclimatized for 1 week before being randomly assigned into control and experimental groups. Mice weighed between 15-25 grams. Simple random sampling was done using lottery method to divide mice into two groups. Group I comprised of Control Mice which were fed on a commercially available standard laboratory diet (20gm/mouse/day) and water ad libitum. Group II , experimental group was further divided into two as Group IIa: Mice were fed a high-fructose diet (20g/mouse/day) and water ad libitum for 08 weeks and Group IIb: Mice were fed with combined mixture of high-fructose diet and sesame meal for 08 weeks. Mice were weighed; naso-anal height was measured before any treatment. The experimental protocol was conducted in accordance with the internationally accepted principles for laboratory animal use. Mice were kept in healthy environment where ample amount of water and food availability was ensured. The mice were sacrificed at the end of the experimental (eight week) period after drawing blood from intra-cardiac puncture. 3-4ml blood was collected in two separate test tubes (one with EDTA and one without it, after twelve hours fasting), blood was centrifuged, serum was separated. Both the tubes were frozen (-80C) till analyzed. Biochemical analysis of blood glucose, triglycerides (TG), high density lipoproteins (HDL-Cholesterol), low density lipoproteins (LDL-Cholesterol), alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (ALP) and bilirubin, was done by using chemical methods on automated analyzers. (Clinical Chemistry Analyzer, Humalyzer 3000, Germany. The reagents used were Randox laboratory kit reagent UK).

Data analysis plan: Data was analyzed using SPSS 17.0 (statistical package for social sciences). Descriptive statistics were used to describe the data. Mean and standard error of mean was used to describe numeric variables like age, weight, height, body mass index, blood glucose, TG, HDL, LDL, cholesterol, LDL, ALT, AST, ALP and bilirubin. ANOVA was applied for the comparison of numeric variables. P value of <0.05 was considered as significant.

Results

Our study included 30 mice which were divided in 3 groups of 10 mice each. Anthropometric measurements were taken in all 30 mice at the baseline. The weight of the mice ranged from 180 to 250 grams with a mean weight of 216.36±21.14 grams. The naso-anal length/ height ranged from 20 to 24 cm with a mean length of 21.9±1.08 cm. The BMI ranged from 3.69 to 5.95 with a mean of 4.51±0.49.The mean height, weight and BMI of the three groups of rats was similar at the baseline; p= 0.829, 0.074 and 0.387 respectively by ANOVA (all >0.05) (Table I). After 8 weeks the mean weight of rats in group I, IIa and IIb was 222±22.7, 302±11.35 and 261±10.48 grams respectively. The mean Cholesterol for group I, IIa and IIb was 162±14.13, 179.5±14.53 and 158.6±11.42 mg/dl respectively. The Cholesterol of HFD group was significantly higher as compared to controls; p=0.014 but the mean Cholesterol of sesame diet group was not significantly different from the control group; p= 0.561. This pattern is also observed in other biomarkers including Blood Glucose, LDL-C, HDL-C, ALT, AST, ALP and Bilirubin. (Table II).

Table I: Comparison of Anthropometric Measurements between Three Groups at Baseline

	Control group (I)	HFD group (IIa)	HFD plus sesame diet group (IIb)	P value by ANOVA
Height in cm	21.9±1.37	21.8±1.03	22.1±0.87	0.829^{NS}
Weight in grams	215.8±21.87	206±21.4	227±15.79	0.074^{NS}
BMI	4.52±0.55	4.35±0.54	4.66±0.35	0.387^{NS}

Discussion

Liver is the largest and most complex internal organ in the body. It plays an important role in the maintenance of internal environment through its multiple and diverse functions. Liver is involved in

Table II: Comparison of Serum Lipids, LFT and Glucose of Three Groups at 8 weeks

	Control group (I) n=10	HFD group (IIa) n=10	HFD plus sesame diet group (IIb) n=10	P value by ANOVA
Cholesterol (mg/dl)	162±14.13	179.5±14.53	158.6±11.42	.004*
LDL-C (mg/dl)	37.8±6.54	107.5±16.2	62.1±7.5	.000*
HDL-C (mg/dl)	90.9±6.36	60.4±16.7	72.0±7.58	.000*
TG (mg/dl)	166.1±22.13	245.1±36.48	177.3±13.8	.000*
ALT (I.U.)	51.7±9.34	215.5±69.8	66.6±18.79	.000*
AST (I.U.)	78.6±13.07	218.7±71.72	71.4±13.71	.000*
ALP (I.U.)	128.5±14.9	255.5±54.59	123.5±16.67	.000*
Bilirubin mg/dl)	1.13±0.13	3.04±0.74	1.14±0.206	.000*
Glucose (mg/dl)	135.9±29.67	215.9±9.55	196.0±13.65	.000*

several vital functions, such as metabolism, secretion and storage. Fructose is metabolically broken down before it reaches the rate-limiting enzyme (phosphofructokinase), thereby supplying the body with an unregulated source of three-carbon molecules. These molecules are transformed into glycerol and fatty acids, which are eventually taken up by the adipose tissue, leading to additional adiposity. Because of its lipogenic properties, excess fructose in the diet can cause glucose malabsorption, and greater elevations in TG and cholesterol compared to other carbohydrates. These metabolic disturbances appear to underlie the induction of leptin (a protein, encoded by obesity gene) and insulin resistance commonly observed with high fructose feeding in both humans and animal models. Fructose induced insulin resistant states are commonly characterised by a profound metabolic dyslipidemia, which appears to result from hepatic and intestinal over production of atherogenic lipoprotein particles.[10] The dietary sesame has been shown to possess hypocholesterolaemic and enhance antioxidant capacity in hypercholesterolemia humans.[11] Feeding of HFD resulted in the elevation of various parameters of lipid profile. The repeated administration of sesame for a period of 8 weeks resulted in a significant decrease in the lipid profile in serum when compared to the dyslipidaemic HFD. Similar findings were found in study by Sedigheh et al [12] that dietary supplementation with sesame oil significantly reduces TC and LDL-C concentrations in rabbits under a lipogenic diet. These findings are consistent with those of previous studies. Visavadiya and Narasimhacharya [13] examined the effects of supplementation with sesame seed powder at 5% and 10% doses along with either normal or hypercholesterolemic diet for a period of 4 weeks. Administration of sesame seed powder to hypercholesterolemic rats resulted in a significant decline in plasma and hepatic total lipid and cholesterol, and plasma LDL-C whilst increasing HDL-C concentrations. In another investigation to evaluate hypocholesterolemic and antioxidant activity of sesame protein isolate, Biswas et al.[14] fed 18% sesame protein isolate with or without 2% cholesterol in comparison with casein to rats for 28 days. The results revealed that dietary sesame protein isolate reduces plasma total cholesterol, triacylglycerol, and LDL-C, increases HDL-C, and mitigates lipid peroxidation in both hypercholesterolemia and normocholesterolemic diet groups. The present investigation clearly demonstrates the Glucose and cholesterol lowering effects of Sesame seed in dyslipidaemic mice.it also high lights hepatoproctective effect by showing improvement in liver function test. More studies in future on a larger scale and at cellular level are required to demonstrate this hepatoprotective effect of sesame seeds beyond doubt.

Conclusion

Our study concluded that high fructose diet results in significant weight gain, elevation of liver function tests, derangement of lipid profile and hyperglycemia. Sesame diet was effective in preventing these biochemical derangement and normalizing blood sugar, liver function tests and lipid profile. Hence it is likely that sesame diet has a hepatoprotective role.

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ORIGINAL ARTICLE

The Effects of Spinal Mobilization with and without Manual Traction in Patients with Cervical Radiculopathy

Safdar Shah, Syed Shakil-ur-Rehman, Shakeel Ahmad

ABSTRACT

Objective: To determine the effectiveness of Spinal Mobilization with manual traction on pain and disability in patients with cervical Radiculopathy.

Study Design: Randomized control trial (RCT).

Place and Duration of Study: The study was conducted at Helping Hand for Relief Rehabilitation Centre Mingore Swat from 1st January to 30th June 2014.

Materials and Methods: A total of 40 patients (23 males and 17 females) with mean age 35+8 were randomly selected and placed into two groups A and B. The inclusion criteria was patients with diagnosed cervical radiculopathy on physical examination were included. The Group A was treated with spinal mobilization with manual traction, while group B was treated with spinal mobilization alone for 6 weeks at 3 days per week. The Neck Disability Index (NDI) and Numeric Pain rating Scale (NPRS) were used to measure disability and radiating pain. SPSS version 21 was used for the analysis of data and paired t-test was applied at 95% level of significance to determine the statistical outcomes.

Results: The results of both groups were significant but group of patients treated with the spinal mobilization and traction managed pain (from NPRS mean score 6.2 to 2.5) and disability (from NDI mean score 29.18 to 13.45) more than the group of patients treated with the spinal mobilization alone (Pain from NPRS mean score 6.1 to 3.15 and disability from NDI mean score 30.5 to 18.21). Statistically the group A showed more significant results (p= 0.001) than group B (p= 0.054).

Conclusion: It is concluded that Spinal mobilization combined with manual traction is more effective than spinal mobilization alone for the management of radicular pain and disability in patients with cervical radiculopathy.

Keywords: *Spinal Mobilization, Manual Traction, Cervical Radiculopathy.*

Introduction

Cervical radiculopathy is a pain and or sensorimotor deficit syndrome that are defined as being caused by compression of a cervical nerve root. The compression can occur as a result of disc herniation, spondylosis, instability trauma or rarely tumors.[1-5] Cervical radiculopathy is a substantial cause of disability and morbidity, and is a common condition, affecting both sexes after middle age. [6,7] Neck pain is a common occurrence and source of disability within the general population with a lifetime incidence as high as 54%. Over one-third of patients with neck pain will develop chronic symptoms lasting more than 6 months, representing a serious health concern. Over 50% of patients with neck pain seen by a general practitioner are referred for physical therapy.[8] Cervical radiculopathy (CR) is frequently encountered in physical therapy with an annual incidence of 83·2 per 100000 people and there is an increased prevalence in the fifth decade of life. The prevalence of neck pain in industrialized countries, annual prevalence is situated within 30 to 50% in adult populations. In accordance with these results, in Canada, a bi-annual prevalence of 54% has been reported.[9] Spinal manipulative therapy includes techniques based on joint manipulation and mobilization, the main difference between each being the amplitude and velocity of the force applied to the vertebra.[10] The mobilization is usually associated with low-velocity rhythmic movements applied in short or large amplitudes, while manipulation involves high-velocity movements applied over small amplitudes. In the past, randomized clinical trials and systematic reviews have shown the efficacy of these techniques on pain relief and function restoration in patients with both chronic and acute specific neck pain.[11-13] Manual techniques developed by Maitland, passive physiologic intervertebral movement (PPIVM) and passive accessory intervertebral movement (PAIVM), are taught by Canadian manual therapy education programs for the assessment of motion between two adjacent spinal segments. There are five grades of mobilization. Mulligan developed Natural Apophyseal Glides (NAG) and Sustained

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Natural Apophyseal Glides (SNAG). Cyriax suggested the use of manual spinal traction and compression as pain provocation techniques to help inform clinical judgments about the intervertebral structure at fault.[14,15] the current study was designed to determine the effectiveness of cervical manual traction with mobilization in the improvement of disability and pain of cervical radiculopathy.

Materials and Methods

This randomized control trial was conducted at Helping Hand for Relief Rehabilitation Centre Mingore Swat from 1st January to 30th June 2014. A total of 40 patients with 23 males and 17 females diagnosed cervical radiculopathy were included in the study. Further diagnosis was made through clinical prediction rules. Patients were randomly placed into two groups. The treatment includes soft tissue manipulation, stretching, mobilization, pain relief modalities (ultrasound, hot and cold therapy) and isometric strengthening exercise program for flexor and extensor muscles.

A written informed consent was taken from all the patients at the start of the treatment program. All the patients were assessed through NDI and NPRS before intervention and at the completion of 6 weeks program. The data of all 40 was analyzed by SPSS-21 and statistical test was applied at 95% level of significance determine the efficacy of both the treatments interventions and compare with each other. Total 40 patients were taken 20 patients in each group (Experimental= Group A, Control = Group B). The NDI and NPRS. Assessment forms were filled from each patient in the first session and baseline score was recorded. Mobilization included unilateral PA (Postero-anterior), Central PA and Transverse glides, these were depends on physical therapist own clinical decision and closely assessing the symptoms with respective mobilization type. Manual traction was given for 10 min with 10 sec traction and 5 sec rest period intermittently up to 10 min.

Results

The results of both groups were significant but group of patients treated with the spinal mobilization and traction managed pain (from NPRS mean score 6.2 to 2.5) and disability (from NDI mean score 29.18 to 13.45) more the group of patients treated with the spinal mobilization alone (Pain from NPRS mean score 6.1 to 3.15 and disability from NDI mean score 30.5 to 18.21). Statistically the group A showed more significant results (p= 0.001) than group B (p= 0.054).

Table I: pre and post mean and standard deviation pain score on NPRS, mean disability score on NDI and p-values for experimental and control groups. (n= 40)

Groups (n=40)	**Experimental Group** (n=20)		**Control Group** (n=20)	
Study Variables	Pre	Post	Pre	Post
Mean and Standard Deviation for Pain on NPRS (0-10)	6.2 ± 2.2	2.5 ±1.9	6.1 ± 1,8	3.15 ± 2.4
Mean and Standard Deviation for Disability on NDI (0-100)	29.18 ± 12.61	13.45±1231	30.5± 9.4	18.21± 10.2
P=values	P=0.001		P=0.054	

Discussion

The results of this study demonstrated that Maitland's mobilization followed with manual traction is more effective than mobilization alone. There are a variety of methods of giving traction which include Intermittent Mechanical Traction, Sustained Mechanical Traction, Intermittent Manual Traction, Sustained Manual Traction, further more these tractions are given in either sitting or supine position but most of the clinician preferred to use intermittent type of traction due to favorable results as compared to sustained type of traction. Bronfort and team conducted a randomized control trial to determine the relative efficacy of spinal manipulation therapy (SMT), medication, and home exercise with advice (HEA) for acute and sub-acute neck pain in both the short and long term. They concluded that for participants with acute and sub acute neck pain, SMT was more effective than medication in both the short and long term. However, a few instructional sessions of HEA resulted in similar outcomes at most time points.[16] Slaven and colleagues found that multiple studies provided evidence that a single session of joint mobilization can lead to a reduction of self-reported pain at rest and self-reported pain with the most painful movement.[17] Although surgery remains one treatment option, various authors have suggested nonsurgical approaches, including cervical traction,

and manual therapies, including HVLA manipulation, among others. The efficacy and safety of HVLA in the treatment of these patients are still controversial, and there are reported cases in the literature of serious sequelae from cervical spine manipulation. But with combination with traction and other manual therapies it gives great relief to sign and symptoms. The limitations of our study were small sample size and short period of time. It is recommended to replicate this study with large sample size, increase time period, and more tolls.[18] Another study conducted by Ali and colloquies conducted on patients with non-specific neck pain concluded that Sustained Natural Apophyseal Glides (SNAGs) manual physical therapy techniques combined with Isometric Exercise training program (IETP) was more effective in reduction of pain and enhancement of function, as compared to those patients treated with SNAGs manual physical therapy techniques alone.[19]

Conclusion

It is concluded that Spinal mobilization combined with manual traction is more effective than spinal mobilization alone for the management of radicular pain and disability in patients with cervical radiculopathy.

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ORIGINAL ARTICLE

Medical Students' Perception about the Effectiveness of Interactive Session in Small Groups

Shazia Riaz, Ahmed Nurus Sami, Fareesa Waqar

ABSTRACT

Objective: To find out the perception of undergraduate medical students about the effectiveness of interactive sessions in small groups.

Study Design: A descriptive cross sectional study.

Place and Duration of Study: This study was conducted at Islamic International Medical College Rawalpindi from 10th April to 12th June 2014.

Materials and Methods: A total of 100 students from 3rd and 4th year MBBS were enlisted on first come first basis out of those who volunteered to participate in the study. They were provided with questionnaire (Table I) to give their opinion about the effectiveness of interactive sessions in small groups as learning tool during undergraduate medical studies.

Results: Out of the 100 participants 65% considered interactive small group discussions effective, 16.7% were indecisive, while 18.3% disagreed that interactive small group discussions were very effective at undergraduate level in medical education. In students' opinion sessions kept the students attentive (93%), promoted group interaction skills (95%) and promoted critical thinking (63%). A majority (76%) thought that there was good retention of the subject discussed in an interactive session. In students' opinion it gave them a good chance to evaluate them (71%).

Conclusion: It is concluded that interactive group discussions is an effective method of imparting education to medical students at undergraduate level.

Key words: *Interactive sessions, Group discussion, Undergraduate Studies.*

Introduction

Enhancement of students' learning skills is one of the primary goals of the educational institutions. Methods of imparting knowledge have remained static for ages. Class room lectures was a norm and its value was never questioned. In the recent past newer methods of imparting education have been considered and introduced in the institutions worldwide and medical education is no exception.[1] Lectures, which were the mainstay of teaching in the past, have been criticized for being a passive form of learning in which the teacher-student interaction is minimal.[2] Total passivity on the part of students may fail to keep them attentive and generate their interest in the subject. Failure of participation and lack of attention may also result in poor understanding and retention of the material taught. Lectures considered now a relatively ineffective way to deliver information are increasingly being replaced by more interactive learning formats.[3] learning is an active process and interactive lectures and interactive small group discussions are considered today as better educational practice compared to non-interactive methods of taeching.[4] According to some research projects such as Tennessee's Star, reducing the size of the class as in small group sessions are likely to produce many benefits for teachers and students. Due the smaller numbers, students receive more individual attention, teachers are able to manage the students better, discipline problems are likely to be less and there is more interaction amongst students and between students and teachers since the students are not passive listeners any more.[5] Suitable teaching methods which aim at involving the students and encourage their participation can motivate them and help them to better utilize their potentials. One of these methods is small group teaching. It is student-centered, students participate and interact actively while the teacher plays the role of facilitator.[6] Interactive small group teaching has been the high-light of a revolution in medical education over the last 40 years.[7] Evaluation of the effectiveness of newer methods like interactive sessions in small groups is a constant ongoing process by experts in medical education. We introduced interactive methods in our college a few years ago. The aim of this study was to assess IIMC students' perception about the usefulness and effectiveness of interactive

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sessions in under graduate medical education.

Materials and Methods

This is a descriptive cross sectional study conducted at Islamic International Medical College Rawalpindi from 10 April to 12 June 2014. One hundred students comprising of 86 female and 14 male students from 3rd and 4th year MBBS were included by convenient sampling technique. A questionnaire was developed by the authors in consultation with experts in medical education to cover various aspects required to find the opinion of students about the effectiveness of interactive sessions at under graduate level medical education. An introductory lecture was given to third and fourth year students about the aims and significance of study. Out of all the students who had volunteered 100 were enlisted on first come first basis to participate in the study. Participants were provided with a questionnaire (Table I) to know their opinion about effectiveness of interactive sessions in small groups at under graduate level. The questionnaire comprised of 10 statements. Opinion was to be made on Likert scales ranging from one (strongly agree) to five (strongly disagree). Each participant was required to mark one out of five statements. Results were compiled as the percentage of students choosing each category on the Linkert scale. The points which were considered in the study included potential of interest generation. Opinion was sought if small group discussion kept them attentive, and if there was good retention of the subject discussed in an interactive session. Questionnaire inquired if interactive session was considered good to enhance critical thinking, and provided understanding of the subject discussed. It considered if participation of a number of students in the form of a group could help gather information and knowledge on the subject, with a view that group work might encourage students to go out of the way to consult books and other sources. One important aspect considered was if the group work helped to enhance interactive skills, and did peer pressure evoke healthy competition amongst the participants. It is a general perception that in traditional method of education through lectures the students did not get an opportunity to evaluate them; opinion was invited if this method did not have that shortcoming.

Table I: Students' response towards the effectiveness of interactive small group discussion sessions. (n=100)

	Statements	Strongly Agree	Agree	Indecisive	Disagree	Strongly disagree
1	Interactive sessions generate interest in the subject.	28	36	22	14	0
2	Interactive session keeps a student attentive	89	4	4	3	0
3	Interactive sessions promote critical thinking	41	22	19	13	5
4	There is good understanding of subject during interactive sessions	13	43	9	30	5
5	Retention of subject is good after an interactive session	18	58	10	12	2
6	Interactive sessions enhance group interaction skills	90	5	5	0	0
7	Interactive sessions encourage students to prepare the topic beforehand	34	19	31	9	7
8	Helps evaluate oneself by comparing with other participants	5	66	23	6	0
9	Provide extensive knowledge on the subject due to combined efforts of several participants in a group.	4	14	36	38	8
10	Generate healthy competition amongst the participants	18	43	8	31	0

Results

Out of 100 participants, 65 % students considered interactive small group discussions effective by agreeing or strongly agreeing with the statements in the questionnaire, 16.7% were indecisive, while 18.3 % disagreed or strongly disagreed that interactive small group discussions were effective in imparting knowledge at undergraduate level in medical education. The points which a predominant majority of participants considered most positive about the interactive sessions were that they kept the students attentive (93%), they attributed this to the active participation of students during a session which maintained their interest and prevented them from getting bored and distracted. It was because of the

potential of the discussion sessions to maintain attention that a good retention of the discussed material was achieved (76%). In students opinion discussion sessions promoted group interaction skills (95%). Participants thought that interactive sessions promoted critical thinking (63%). Predominantly (71%) considered interactive sessions gave students a fair chance to evaluate them, only 6% disagreed. Owing to active participation a majority of students (64%) considered that interactive sessions generated interest in the subject, 14% thought otherwise. Regarding encouragement to prepare the topic before-hand only 53% agreed that interactive sessions encouraged students in this regard, 31% were indecisive while 16% disagreed, thus not showing any significant advantage in this regard. Most of the respondents did not agree that interactive sessions helped to provide extensive knowledge (46%), only 18% gave positive response to the question, and 36% remained indecisive, indicating that interactive sessions do not significantly promote students to go out of the way to improve their knowledge. Fifty-six percent participants agreed that subject is well understood during interactive sessions, 30% disagreed with this which shows that a third of the participants fail to grasp well the subject discussed. A positive aspect of group discussions agreed upon by 61% students is that they generate healthy competition among the participants.

Discussion

The results of our study on perception of students regarding effectiveness of interactive group discussions show that interactive small group discussion is an effective method of learning with the point of view of understanding and retaining knowledge at undergraduate level. Active participation increases understanding and confidence, and encourage students to participate actively in discussion.[8,9] Students agreed that there is good retention of topic after interactive small group discussion because of active participation, extrinsic and intrinsic motivation[10] which is similar to our study in which 76% agree that interactive sessions result in retention of discussed material. Students receive more attention in small groups, they think that it provides more group interaction skill because there is generation of new ideas through brain storming , they get opportunity to talk freely as there is minimum intervention of tutors and criticism from them.[11] In our study the students considered that interactive sessions kept them attentive because of their active participation, this is similar to the findings of a study from Iran.[12] The educational research has shown that students who are actively involved in the learning activity will learn more than students who are passive recipients of knowledge as in a lecture.[13,14] Studies have demonstrated that increased attention and motivation enhances memory.[15] In fact, some authors have said that increased arousal and motivation are the essential ingredients for learning and are often more important for retention than intelligence. Active involvement enhances the student's level of understanding and ability to integrate and synthesize material.[16] Active participation also improves the student's conceptualization of systems and how they function and increases the student's level of retention.[17] This is particularly important in medical education, where the application and use of information is as important as the retention and recall of facts. In a study done in Hong Kong, many aspects of small groups students centered activities were highly valued by students.[18] In Malaysia In a study conducted in two medical colleges, 79.0% of respondents found problem oriented class sessions interesting. which indicates effective understanding of subject contents with the help of interactive lecture.[19] Majority of students in our study (63%) agree that interactive small group teaching promotes critical thinking, it is in line with the finding in the study that questioning, reasoning, listening , responding and explaining ,which is a part of interactive small group discussion stimulate students critical thinking and increases their interest in subject contents.[20] A study based on self reports from participants as well as from observational data shows that interactive lecturing techniques is successful and more effective than non-interactive lectures.[21] This study was limited to students of only one medical college and with a limited sample size. Further studies on the subject must be conducted to incorporate and compare vast data to arrive to a conclusion.

Conclusion

It is concluded that undergraduate medical students consider interactive small group discussion effective as a tool of imparting knowledge because it keeps the participants attentive, promotes group interaction skills and critical thinking. They think that subject is well understood and discussed material is well retained after an interactive session. It also provides them a chance to evaluate them.

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LETTER TO THE EDITOR

Non Surgical Management of Acute Appendicitis

Appendectomy for acute appendicitis in emergency is universally accepted and effective procedure.[1] Only in United States more than 300,000 appendicectomy are performed annually. Statistically, the life-time risk to have acute appendicitis is 8.6% in men and 6.7% in women but the risk for emergency appendectomy is 12% and 23%, respectively. Pathologically, acute appendicitis progresses invariably from mild inflammation to gangrene and perforation and as a treatment the emergency appendectomy is always required.[2] The non-operative management of uncomplicated acute salpingitis, cholecystitis and diverticulitis has been well established but the non-operative management of acute appendicitis remains controversial.[3] Some centers or surgeons use preoperative antibiotic to treat acute appendicitis in selected cases for delaying an appendectomy, particularly during twilight hours. In these cases the incidence of perforation, other complications and hospital stay especially in children operated within 6 h is equivalent to those who underwent emergency appendicectomy between 6 and 18 h after admission.[2] Literature review conclude that although antibiotics may be used as the primary treatment in acute appendicitis in selected cases, but this is treatment option is less likely to supersede appendectomy as a definitive treatment modality.[2,4] There are only one Cochrane analysis, five meta-analysis and some review article were found after extensive literature search about non-operative treatment of acute appendicitis. All these studies concludes that non operative treatment may reduce the post operative complications rate but the lower efficacy of treatment is the main concern which prevent the surgeons to adopt antibiotic therapy from being a first-hand alternative to surgery.[2,5,6] On the other hand, appendectomy may not be always necessary for the patients with uncomplicated acute appendicitis as many patients resolve spontaneously or with antibiotic therapy. Six randomized controlled trials (RCTs) have compared the efficacy of antibiotic therapy with surgery in the treatment of acute appendicitis.[2] A recent meta-analysis by Mason et al reported that the conservative management of uncomplicated acute appendicitis is associated with significantly fewer complications, better pain control and shorter sick leave. But have overall inferior efficacy due to high recurrence rate (10 – 20%) after conservative treatment.[5] Generally speaking, many of these experiences reported in literature did not receive much attention and consequently early appendectomy remained the standard treatment for acute appendicitis in order to avoid perforations or peritonitis even though population-based evaluations have reported significant long-term risks following surgical intervention for acute appendicitis.[6,7] Pisano and his colleagues reported that 1.3% individuals who had appendicectomy, require surgery due to small bowel obstruction by 30 years and that the 30-day mortality of emergency appendicectomy is 0.24% with an increased standard mortality ratio.[8] Literature review and my personnel experience concludes that the appendectomy may not be necessary for the majority of patients with acute uncomplicated appendicitis, as many patients resolve spontaneously and others may be treatable with antibiotics alone. However, the supporting documentation is scant and of low impact on this topic. A randomized, prospective trial of non-operative management versus early appendectomy of acute uncomplicated appendicitis should be conducted in our set up to review the trend of emergency appendicectomy in each case.

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