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LUPIN PHARMA

LUPIN

For The Management of Osteoporosis

For The Management of Osteoporosis

℞ CORCIUM Fit

Coral calcium, Vitamin D3, Zinc gluconate, Pine bark extract

℞ CORCIUM PLUS

Coral calcium, Folic Acid, Vitamin B6, Vitamin B12 (as Cyanocobalamin) (Cap)

℞ CORCIUM K2

Coral calcium, Calcitriol, Vitamin K2 (Tab)

For the maintenance of joint health

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Orthopaedic Residency and Mentorship

Jain S

Medical training, specially the post graduate is stressful, exhaustive and overburdened. Orthopaedic residents are among one of the most affected subjects. Due to obvious reasons and lacunas in our system, residents join post-graduation at a later stage of life and have increased expectations and responsibilities both clinically, academically and familial. They are expected to fulfil multiple roles in addition to their family responsibilities during the training – clinical and surgical, self-educating and teaching, research and thesis writing and administrative.

Our Orthopaedic residents are commonly seen residing in hospitals itself, dressed very shabbily with all plastered shoes and clothes, who must not have attended any family function for years, must not have met family members for months; he must be unshaven for weeks, not taken a proper bath for days, may empty stomach for hours and may be on continuous work for days with many sleepless nights. Forget about the balanced diet, they are deprived of meals or even water for sessions.

A regular typical week of work includes running OPD services, OT duty and grand ward rounds, done each twice a week, making a resident busy all 6 days a week. Further he has to attend regularly teaching classes, make his own seminars and journal, do thesis work, and daily evening rounds routinely including dressing, plasters, clinical notes and other work etc. Residents have weekly or twice a week "duty day" means 24 straight hours of emergency/casualty posting and OT services blended with next "regular" work day without a break, which is sleep-deprived duty.

Clinically, our residents are overburdened due to abnormally high patient load in few performing government medical colleges and acute shortage of postgraduate medical seats. Further, there is lack of basic infrastructure in these government set-ups and at times even unavailability of basic essential materials likes gloves, dressing material, sutures or plaster material, which make them prone to risk. We all have seen residents getting pricked, exposed to radiation due to lack of lead aprons.

In a highly infected zone of government hospitals, poor conditions of duty rooms and inability to take self-care, balanced diet and proper sleep, our residents, are susceptible for diseases. Some of our residents are already on anti-tubercular treatment.

With very long working hours, heavy workload and relatively low control over the job contributes not only to physical, but also mental illness. Our residents are stressed and depressed, reasons may be many. Hierarchical structure, staffing pattern, overburden, and fear of failure in examinations are few of them. Juniors are not allowed to express opinions in treatment related decisions. This can lead to poor academic performance and research work. The work order also follows a hierarchical system from senior most to immediate successor and finally to junior most, who does the work, but is not credited for it. Female rarely opt for orthopaedics, hence the politeness and softness of talk is absent, orders are often with abuse and foul language. Unlike faculty and paramedical, residents are temporary staff and have fear to perform in exam which is being judged by faculty. Further in most of these set-ups, the paramedics are non-functioning, due to which our residents are forced to do the routine work of these paraclincial worker also like nurses, plaster, lab and x-rays technicians, dressers, ward boys and sometimes sweepers too, in addition to their own clinical and teaching work. The lack of basic common sense and ignorance in kind of illiterate patients these hospital deals further add to repetition of work and increased workload. This high workload leads to poor performance and tendency to make mistakes resulting in depression, anxiety, fatigue, irritability, substance abuse

and sleep deprivation which can be fatal in medical environment. There are countless cases of medical negligence being regularly reported. Some of our residents are already hypertensive or on anti-depressive treatment. Some of the resident's parents have already migrated to medical college cities. There are reported incidences of even suicides in medical residents. To reduce work load, some residents "unofficially" indulge in unethical practices like LAMA, instigate the patient to go somewhere else for treatment, expressing doubt at the ability of consultants and scare away the patients.

They are the future of the next generation of Orthopaedics and they will operate on us when we will need surgery. It's good to improve the degrading health care system by improving the medical facilities and infrastructure, but we should also look to improve the working conditions our residents as well.

The solutions are relatively simple. It doesn't take a movement to do; it only needs a will to improve as each level - government, administration and faculty level.

At hospital administration level, we should provide all basic infrastructure and protective measures, minimally required. Why can't be these small things like bandages, cotton, gloves, medicines, which are the cheapest be available in the hospital. The medical hospitals should specifically work as tertiary referral centre as in abroad. Why should a simple tibia fracture be referred from a district hospital to medical hospital?

As senior and faculty members, we should not support or justify excessive work as tradition of good training process. It's good to do more clinical and surgical work, but the work needs to be properly distributed, with each one responsible to shoulder his work. Paramedical should be made responsible. Teaching and learning activities, with novel treatment methods should take a front seat. Proper research and thesis work should not be just a formality.

At government level, overburden should be decreased by increase in postgraduate seats and making proper referral systems of the health care system. THE residents who work so hard should be paid sufficiently and regularly. Further, if residents can't cope up the burden of the subject he should be made free to leave or change the branch freely without any contracts, bonds or payback penalty.

Orthopaedics is a different subject than others, newer sub – specialities are developed. Government should understand the importance of Orthopaedics as a separate subject and need of super-speciality courses in orthopaedics. There are only hand full of fellowships which are irregularly distributed with no authenticities and proper entrance criteria. Our curriculum needs to be more structured and updated. Old method should go and new ways should find a place. Our teaching, evaluation, the exam pattern, operative skill, knowledge and ethics all needs to be checked and improved. We need mentoring rather than just teachers, who could share their personal and professional problems.

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Effectiveness of Cortical Window Technique for Revision Hip Arthroplasty

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Investigation preformed at University Hospital of Morecambe NHS trust, Lancaster, UK

Abstract

Background: Revision total hip arthroplasty requires removal of cement, cement restrictor and stem followed by canal preparations and reaming. Extraction of femoral component is a challenging problem. There are many techniques being used and described in the literature with all having associated with them. We reviewed the effectiveness of new cortical window method for femoral stem extraction in revision hip arthroplasty.

Material and methods: We retrospective reviewed the result of all our patients operated for revision total hip arthroplasty by cortical window creation in diaphysis of femur for extraction of femoral stem. Window size ranged of 2.5 cm x 5 cm to 2.5 x 7.5cm. We analysed the results for age, indication and type of surgery, size and method of closure of cortical window etc. Outcomes recorded were assessed on pain and mobility.

Results: 13 patients with mean age 76 years (range 60 to 88) with mean time duration of revision surgery with 12.5 years (range 5 to 25 years) were included in study. In 11cases femoral stems (85%) were extracted very easily while in 2 cases it was difficulty. In all cases, except one, the size of cortical window was 2.5 cm x 5 cm. In 10 cases, cable wires were used to fix the cortical window, were as in 3 cases of peri-prosthetic fractures additional plates were used. At 6 months 7 (54%) patients were pain free and 5 (38 %) of patients had mild pain. All patients had good mobility with able to do all daily routine work comfortably.

Conclusion: Cortical window is an acceptable technique which can be used during revision total hip replacement. It can be performed in any age regardless of indication of revision. It reliably allows surgeon to prepare canal by removing all components.

Keywords: Revision total hip arthroplasty, Cortical window, Femoral stem extraction

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Introduction

Total hip arthroplasty (THA), nowadays is a routinely performed surgery to provide painless, mobile and stable hip, which is used in various indications like arthritis, trauma, deformities, inflammatory arthropathies etc [1,2]. With the advancements in implant designs, materials, fixation techniques, modern operation theatre facilities and developments in medical field, the incidence of complications following THA, is brought well under control. Still the surgery is not free of complications and some complications warrant repeat surgery with revision of implants (Revision Total Hip Arthroplasty) [3-5].

With the increase in aging population, availability, extension of indication and excellent short and long term outcomes, of the number of THA performed is increasing tremendously and hence the number of revision is also increasing. Further the number

of patients requiring revision will also increase tremendously [6]. Removal of old implant (acetabular and femoral components) is essential and strenuous step of revision surgery [7]. Despite many techniques described in literature globally, need for a better, less invasive and reliable method of extraction still exists. Hence we conducted this study with aim to evaluate, the effectiveness of "cortical window" technique for successful extraction of femoral component. It also aims at assessing indications, complication, healing of window, mobility improvement and complications related to cortical window mortality and pain following surgery.

Material and methods

This is retrospective observational study is performed on all revision arthroplasty patients operated at our centre by cortical window technique to femoral component between March 2012 to September 2014. Notes of all the patients who underwent revision surgery were reviewed. All patients of revision hip arthroplasty operated by cortical window technique for cemented or uncemented femoral component removal operated in chosen time period were included in the study. Patients with insufficient follow up of less than 6 months were excluded from study so as to analyse healing of window radiologically. Cases, where different surgical techniques for extraction other than cortical window (for e.g. femorotomy or extended trochanteric osteotomy) were used were also excluded. Patients operated by other surgeons, who are not authors to this article were also not reviewed in this study. Thus 13 patients were included in final cohort after filling the inclusion criteria and they formed the study group.

Cortical Window Method: Initially, the exact site of creation of cortical window was estimated from preoperative assessment of x-rays and CT scans which was, just below the tip of the prosthesis on lateral aspect, distally. Posterior approach to hip joint was used to expose the femur. Then cortical window site was marked and with a 2mm drill bit 4 corners of window were drilled and with an oscillating saw these corners were joined to make a square window. While preparing the window, oscillating saw was angled in such a way to produce bevelled edge of window so that it effectively increases surface area of window edge, in turn increasing the contact area between two sides of osteotomy and will enhance healing. Window, a controlled defect created in femoral canal now allows assessment to the femoral implant, cement and cement restrictor for extraction. Various types of osteotomies are used to aid removal of cement. After the procedure, cortical window fragment is replaced back and secured in place with circlage metal cables (fig 1).

As the study was retrospective, the data collection was done by reviewing the patient's electronic medical records, which is regularly maintained in our institute. The operative theatre database as well as operative notes of these patients was also reviewed. Data for variables like age, dates of primary and revision THA surgery, indication for surgery, type of surgery cemented or uncemented, events during surgery and OPD follow up dates etc were noted. The size and use of method of closure (plate, cables or bone graft) of cortical window was also reviewed. Outcomes recorded were assessed on pain (no pain, mild, moderate or severe pain) and mobility at subsequent follow up appointments. Patients X-rays were reviewed for radiological assessment of healing of window, subsidence and presence of any fractures.

Fig 1. Pre-op (a) and post-op (b) x-rays of a patient whose primary THR was revised by cortical window technique

Results

A total of 13 patients with mean age 76 years (range 60 to 88) were included in study. The mean time duration of revision surgery from the primary THA was 12.5 years (range 5 to 25 years). 8 patients (62 %) had revision because of aseptic loosening, 2 due to infection and 3 patients (23%) had fracture as the indication for revision surgery. Almost all patients (12 patients) of cortical window for cemented stem extraction had cemented femoral component except one who needed cortical window for removal of uncemented implant. 12 patients out of 13 had revision of both femoral and acetabular component and 1 patient had revision of only the femoral stem.

As per the operative notes, 11 femoral stems (85%) were extracted very easily after making a cortical window while 2 femoral stem implant removal was done with difficulty. In 9 patients, window was made to remove either cement or cement restrictor, whereas in 3 cases window was made to remove the broken part of femoral stem.

Revision THA was done with "Reclaim" (Depuy) prosthesis in 10 patients, whereas Wagner type uncemented long modular revision prosthesis (Depuy), "Reef" prosthesis which is distally interlocked modular revision femoral stem (Depuy) and cemented "C Stem which is triple taper polished femoral stem (Depuy) was used in one case each.

In almost all the cases (12 cases) size of cortical window was 2.5 cm x 5 cm, whereas in one case the size was slightly bigger window i.e. 7.5 x 2.5 cm. In 10 cases only metal cable wires were used to fix back the cortical cover of the window. In 3 cases additional plates were also used to increase the stability of a pre-existing fracture as these cases of peri-prosthetic fractures. None of the cases needed bone grafting except in one case with longer cortical window, in which reaming material obtained were used as bone graft around cortical window.

Full radiological healing of cortical window was seen in 9 cases in less than 3 months whereas 2 cases took upto 18 months to heal. There was insufficient follow up available for 2 cases to comment on healing. In one 1 case of subsidence was found on initial x rays which was stable as seen in subsequent follow ups.

Initially at 6 weeks, 2 patients were pain free and 11 patients had mild pain whereas one had moderate pain. No patients reported severe pain after Revision Total Hip Replacement. At 6 months 7 (54%) patients were pain free and 5 (38 %) of patients had mild pain. All patients had good mobility with able to do all daily routine work comfortably.

Discussion

Although Total hip arthroplasty is provides excellent short and long term outcomes, but like all procedures, it is not free of complications [3-5]. Complications arising out of the primary total hip arthroplasty may demand a revision surgery with removal or exchange of previous components. Reasons which need revision total hip arthroplaty are usually aseptic loosening, infection, peri-prosthetic fracture, recurrent dislocation and mal-positioning of components [6-9].

The primary and crucial step in revision surgery is to remove the previously implanted components without much iatrogenic tissue trauma. Thus removal of old implants is a challenging arduous task for surgeon which is extremely demanding, time consuming and can potentially cause more damage to host bone [10]. Various techniques and instrumentation for approaching the femoral part of component have been mentioned in literature, all having their own set of complications like invasive, non-union or migration of osteotomies and delayed weight bearing [11-18]. A conventional trochanteric osteotomy, which is too proximal, has limited value in removal of well-fixed femoral implant and cement distally. It also has associated complications of non-union, proximal migration of trochanter and trendelenburg gait disturbance [11,12]. Complications reported with a sliding trochanteric osteotomy were non-union and minor fractures [13,14]. An extended trochanteric osteotomy gives better exposure femoral implant, cement mantle and cement plug removal [15,16]. However, Scott

King et al reported 18 % intraoperative fracture with trochanteric tip fracture and trochanteric migration rate of 18 % was also noticed [17]. Antal et al recommended use of retrograde genocephalic removal in selected cases of broken femoral stem but this may lead to fracture while impacting and infected cases can lead to a spread to the knee joint [18]. Ultrasonic devices are costly and not available in all hospitals.

Cortical window method is a novel method used for femoral stem extraction [19-23]. Some of the surgeons have used cortical window creation for extraction of stem, but they created window proximally on anterio-medial aspect, but we created a cortical window distally, 1cm below the tip of the prosthesis on lateral aspect, with exact site estimation done by x-rays and CT scans. We used an oscillating saw by joining the corners of pre-drilled holes at corners of window, to create a controlled defect. Window, thus created in femoral canal allowed access to the femoral implant, cement and cement restrictor. After the procedure, the cortical window fragment is replaced back and is secured in place with circlage metal cables.

Cemented femoral stems require revision more than uncemented stems. In our series, 12 were (92%) cemented stem and only one was uncemented stem. During assessment it was noted that in cortical window was required to remove the femoral stem in only 15% cases, which was difficult. In rest of the cases, stem was easily removed even without making the cortical window, but the cortical window technique was still required to remove cement restrictor and cement and for canal preparation. In two cases, access to acetabulum was difficult to establish because of femoral implant, hence in these cases cortical window can be performed first to aid removal of stem, to increase acetabular exposure.

In all reported series majority of the revision THA are done for aspetic loosening like in our series, which takes years to occur after the primary surgery [6,8]. Hence the higher mean age and delay after the primary surgery is understandable. Our study, demonstrate that cortical window technique, can be used in extraction of femoral stem, despite of presence of aseptic loosening. Almost in more than 90% of our cases, revision was done by uncemented long Wagner type modular stem and cemented long femoral stem was done in one case, with ease.

Further since there is loosening in these cases, the extraction can be done easily with small size window of 2.5 cm x 5 cm as ours. This is much smaller breach in cortex compared to extensive trochanteric osteotomy. Further, since the window is smaller in size, it heals very well in 3 months only, with only cables or wires and doesn't require additional plates or bone grafts, except in cases, where the indication of revision is a peri-prosthetic fracture, because closed lid itself act as bone autograft and helps with healing process. In some of our patients, cortical window took too long to heal, probably because radiological healing of window is very variable and it is possible that these cortical windows are healing without callus formation with the formation of cutting cones which is less visible on x-rays [24].

To improve the quality of data, a larger sample size with a comparison group, longer follow-up and data from prospective sources is recommended. A detail collection of confounding factor data and statistical analysis will reduce selection bias.

Conclusion

The cortical window procedure can be successfully performed in extremely elder patients in almost all types of indications for revision total hip arthroplasty for femoral stem extraction with easy. It can be used for both cemented and uncemented prosthesis. The cortical window so made which can be fixed with cables or wires only, show good healing in 3 months. Surgeons can certainly add cortical window technique to their armamentarium as a possible solution when faced with complex revision of femur.

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A Study To Evaluate Functional Outcome Of Uncemented Primary Total Hip Arthroplasty Operated At Our Center

Bansal A, Singh R, Zuber M, Gaur S

Investigation performed at Department of Orthopaedics, Gandhi Medical College & Hamidia Hospital, Bhopal (MP), India

Abstract

Background: Total hip arthroplasty (THA) has evolved into a reliable and suitable surgical procedure to relieve pain and restore function among patients with damaged or degenerated hip joints and chronic pain. The purpose of this study was to evaluate outcome in patients after THA operated at our center.

Methods: 150 hips in 115 patients were operated at our center and were included in the study. These patients were evaluated with Harris Hip Score before and after surgery at 1, 3, 12 month and as well as final follow up after surgery.

Results: Out of total 115 patients, 89 were male and 26 were female. The mean age was 38 years in our series with more than 62% patients with less than 40 years. Functional outcome in our series as assessed by Harris Hip score was excellent in 90.5% and good in 9.5%.

Conclusion: THA is an excellent procedure to achieve painless, mobile, stable hip in cases with advanced hip problems.

Keywords: Total hip arthroplasty, Harris Hip Score, Osteoarthritis.

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Introduction

Total hip arthroplasty (THA) has evolved into a reliable and suitable surgical procedure to relieve pain and restore function among patients with damaged or degenerated hip joints [1-3]. Indication for a THA ranges from radiological evidence of joint damage, persistent pain, and/or functional disability that is not adequately relieved by non-surgical treatment to patients with primary osteoarthritis, fractures or rheumatoid arthritis [1,4-6].

The annual number of THA has risen steadily worldwide during the last decades. As the number of primary surgical interventions grows, the number of revisions is expected to increase [7]. The outcome of a successful THA depends on numerous factors other than the surgery itself. The predictability of the outcomes of THR is excellent in the older age groups, whereas the longevity of the implant in young and active patients still remains unsatisfactory, with failure rates ranging from 20% to 42% [8-10]. We evaluated the outcome of all uncemented THA patients operated at our center to analysis our results and compare it with available literature.

Material and methods

A total of 180 hips were operated with total hip arthroplasty from January 2013 to August 2017 at our center. All patients with in age

group 20 to 70 years operated for uncemented THA who gave written informed consent were included in study. 30 hips were lost to follow up or did not give consent for the study and hence were excluded from the study, making the final cohort of 150 hips in our study.

In all patients a detailed history and thorough examination was done evaluating pain, tenderness, deformity, gait, range of motion, limb length discrepancy, neurovascular status etc. Pre operatively Harris Hip Score and SF-36 Score was also recorded. All patients was subjected to routine blood investigation, Chest X-ray, ECG, X-ray pelvis with both hips and lateral view of involved limb and pre-anesthetic fitness before surgery. Patients were operated spinal or epidural anesthesia in floppy lateral position by surgeons of almost same experience and expertise (fig 1). Postoperatively, all patients were subject to same rehabilitation protocol like active quadriceps exercises, knee and ankle exercises from second post-operative day, weight bearing with support on third day post-operative day and suture removal on 14th day. Regular follow ups were done and at final follow up functional assessment was done, using Harris Hip score.

Fig 1. Intraoperative photos showing position (a) acetabular (b) & femoral (c) implantation

Statistical analysis was done using Statistical Package of Social Science (SPSS Version 22; Chicago Inc., USA). Quantitative variables were compared using mean values and qualitative variables using proportions. Significance level was fixed at $P < 0.05$.

Results

A total 150 hips in 115 patients were included in study out of which 89 were male and 26 were female. The mean age was 38 years (range 28 to 68 year). 88 % of our cases were less than 50 years and 62 % were less than even 40 years. 38 % of the cases have fixed deformity at the involved hip, among which fixed flexion deformity was commonest seen in 14% of cases. All the fixed deformities were corrected and none of the patients had fixed deformities postoperatively. The most common indication of THA was avascular necrosis of hip, seen in 66.7 % hips followed by rheumatoid and posttraumatic arthritis seen in 10 % each. The mean follow-up was 23 month (range 12 to 48 month)

The mean pre-op Harris Hip Score of 49 (range 28 to 78) improved to 95.07 (range 87 to 98) postoperatively at final follow up. This improved Harris Hip Score was seen as continuous improvement from pre op to regular subsequent visits and at final follow-up which was statistically significant ($p<0.05$) (fig 2). Mean SF-36 score was reduced from 78.90±6.71 (range 64 to 90) pre-operatively to 40.35±3.67 (range 31 to 49) at final follow up which was statistically significant ($p<0.05$) (fig 3).

Complication was found only in 4 (2.67 %) patients, with dislocation in one and superficial infection in 3 patients. More than 1 cm limb length discrepancy was seen in 25(16.7%) patients with overall mean discrepancy of 0.24 cm (range 0 to 3cm).

Fig 2. Mean Harris Hip score at follow-up visits

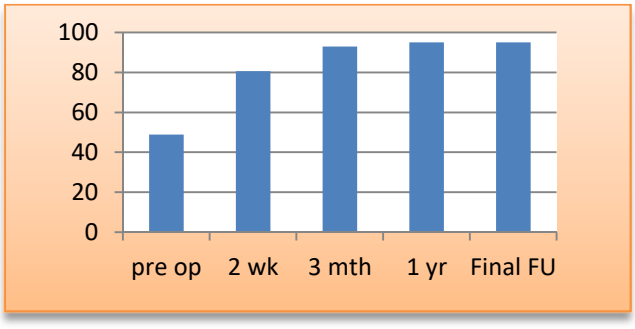

Fig 3. Case of bilateral AVN hip with THA done

Discussion

Despite the exceedingly high rate of success of THA in both short and long term follow up studies; numerous potential complications resulted from this type of reconstructive surgery [2-4]. With the advancements in implant designs, materials, fixation techniques, modern operation theatre facilities etc, the outcome of THA have improved significantly [5-8]. We evaluated functional of THA in 150 hips operated at our center by Harris Hip Score.

THA is no longer confined to elder patients with an increasing number of patients now belong to much younger population. The mean age in our series of 38 years, was much younger than previous studies compared to mean age of 59 (range 55 to 69 years) in reported literature [7-11]. This may also be attributed because more than half of the patients who underwent THA had avascular necrosis, which occurs in young, whereas primary degenerative osteoarthritis which is typical seen in elderly population was primary indication of THA in reported series. Most common indication in our series of avascular necrosis of femur head (66%) was different from known reported series which show primary arthritis of hip as main indication needing THA, because primary degenerative osteoarthritis is not seen in this part of the country [7-12].

Harris Hip Score has been widely used as a gold standard tool for the clinical evaluation of patients following THA [9-14]. In our series, the mean pre-op Harris Hip Score improved from 49 to 95.07at final follow-up, which is seen as statistically significant increment at each follow-up. The higher pre-op harris hip score due to the fact that cases in our study population presented with their complains at a later stage of the disease. The results obtained in our series are similar to those published series [7-14]. The lower incidence of complications like infection and dislocation in our series is due to fact that we followed the protocol strictly for asepsis and component position.

SF – 36 score has been widely used as a quality of life questionnaire for clinical evaluation of patients about their health. In our series mean SF – 36 score was 78 preoperatively and 40 postoperatively. Overall our study shows that outcome of THA done at our center has 90.5 % excellent and 9.5% good results specially in younger age group patients in short term follow-up. But longer studies are needed, especially in younger age group to evaluate the longevity and feasibility of THA in younger patients.

Conclusion

THA continues to be an excellent procedure to achieve painless, mobile, stable hip in cases with advanced hip problems. Proper clinical evaluation, appropriate measures to correct deformity, adherence to protocols and proper rehabilitation is essential to achieve excellent functional outcome.

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Role of Ponseti Technique of Manipulation In Children with Idiopathic Club Foot Presenting After One Year Of Age. A Retrospective Study

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Abstract

Background: The Ponseti method of manipulation is accepted as a gold standard treatment for idiopathic clubfoot in infants. However, very few studies are available in literature on the use of this method in older children. The aim of this study is to determine the effectiveness of Ponseti manipulation technique in the treatment of late presenters of congenital idiopathic club foot deformity.

Material and Method: We retrospective evaluated the results of 23 children (15 males and 8 females) with 32 clubfeet deformity presenting after the walking age, which were treated with Ponseti manipulation. The outcome assessment was done by Pirani Score. Quantitative variables were expressed as mean ± standard deviation and compared between initial and last follow-up scores using the paired *t*-test.

Results: The mean age at presentation was 3.4 (range 1 to 15) years. The mean pre-correction total Pirani score was 4.51 (range 2.5 to 6) which improved to mean post-correction total Pirani score of 0.55 (range 0 to 1). This difference was statistically significant ($p < 0.001$). In 95% of the feet, satisfactory correction of the deformity was achieved. The mean number of casts applied was 9.2 (range 6 to 16). The mean follow-up duration was 14.2 (range 2 to 21) months.

Conclusion: We conclude that the Ponseti technique of manipulation is an effective method for the management of idiopathic clubfoot deformity in older children as well.

Key words: Idiopathic club foot deformity, Ponseti technique, Pirani score.

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Introduction

Club foot (CTEV) is one of the most common congenital musculoskeletal defects which require correction [1]. Treatment of congenital club foot deformity has changed radically with the introduction of the Ponseti method in most centres worldwide. However, most of the studies on Ponseti method are done in infants or children before the walking age [1,2]. But, in our country, late presentation for the treatment for this deformity is common problem due to social stigma, lack of education & ignorance, poverty, lack of proper health services and maltreatment. It often results in significant disability resulting in dependency for activities of daily living, significant financial and psychological impact on the family as well. Many patients with clubfoot end up living as beggars on the streets [3,4].

When the a CTEV child presents late after the walking age, the deformity becomes worse causing further contracture of the medial soft tissues and plastic deformation of bones, which makes treatment difficult. In the past decades many extensive soft tissue and bony surgeries

have been performed to treat such deformities, but the results were not very promising because surgeries were associated with many complications such as poor soft tissue healing and higher relapse rate [5,6]. Some studies have shown excellent role of Ponseti method of manipulation in late presenting walking child with club foot deformity [7-10]. Inspired by these, we retrospectively analysed our cases of late presenters of congenital idiopathic club foot deformity, which had been treated in the club clinic of our institution by Ponseti manipulation technique, with the purpose to assess the role of Ponseti method in neglected club foot.

Material and methods

We retrospectively reviewed the records of 29 patients of neglected club feet deformity who had been treated in the club foot clinic of Department of Orthopaedics, at our centre, from April 2015 to March 2018 by Ponseti method of manipulation after the institutional board approval. All children with idiopathic club foot deformity with age more than 1 year and had not taken any form of treatment previous and who were treated by Ponseti manipulation were included in the study. Secondary club foot, failed cases of previously manipulated or operated feet, atypical club foot, clubfoot deformity with ulcers over callosities for which cast could not be applied and children less than 1 year were excluded from the study. Thus after fulfilling the inclusion criteria, only 23 cases (32 clubfeet) were included and 6 were excluded from the study.

As seen from the treatment record and patient information sheet of the cases, parents of all the clubfeet children were found informed in their language, about the treatment protocol and all consented. All cases were initially evaluated by Pirani score to grade the severity of deformity [11]. Then they were treated by manipulation and regular serial weekly above knee cast application by with Ponseti's technique of manipulation [11]. All cases were asked to review weekly and regularly in CTEV clinics for re-manipulation.

The casting and manipulation continued till, the desired position of foot achieved i.e. able to abduct 40°, which is recommended for younger children, instead of the 70°, which is desired position for infants [7]. The residual equinus deformity was corrected by a percutaneous tendoachilles tenotomy performed under local anaesthesia or short general anaesthesia in all patients. Following tenotomy, an above knee cast was reapply with foot in 10° dorsiflexion for 3 weeks in child less than 3 years and for 4 weeks in patients more than 3 years. A repeat tenotomy of was done in children where adequate dorsiflexion, i.e., at least 10° of dorsiflexion was not achieved even after one month of first tenotomy. In cases with residual cavus present, percutaneous plantar fasciotomy was done. After the deformity was corrected and cast removed, a foot abduction brace was prescribed to all patients for next 2 years. Initially the brace was worn for 23 hours a day for the first 3 months and after that brace wearing was done only during night time.

In our retrospective analysis we evaluated age at the time of presentation, severity of deformity by the Pirani score at initial presentation, change in the Pirani score after the final cast, the number of casts required to achieve full correction and any complications during the casting or bracing phase of the treatment. The quantitative variables were expressed as mean ± standard deviation and compared between preoperative and postoperative follow-up using the paired *t*-test. Statistical analysis was performed and a $P < 0.05$ was considered statistically significant.

Results

23 children with 32 clubfeet deformity were included in the study. 9 had bilateral involvement whereas 14 had unilateral deformity (32 clubfeet). There were 15 male and 8 female patients.

The mean age at presentation was 3.4 (range 1 to 15) years. The mean pre-correction Pirani score was 4.51 (range 2.5 to 6). The mean post-correction Pirani score was 0.55 (range 0 to 1). This difference was statistically significant ($p < 0.001$). The mean number of casts applied to achieve final correction was 9.2 casts (range 6 to 16). In 95% of the feet, satisfactory correction of the deformity was achieved (fig 1). The mean follow-up duration was 14.2 (range 2 to 21) months. Percutaneous Achilles tenotomy was done in all cases to correct residual

equinus, whereas percutaneous planter fascitomy was done in 6 cases for cavus.

Fig 1. Pre (a) and post (b) correction clinical photography of CTEV case of age 9 year with pirani score pre (6) and post correction (0.5)

Four patients developed erythema and slight swelling of the toes, and redness of the skin due to excessive pressure, for recasting was done. No infections, skin necrosis, neurovascular compromise or profuse bleeding after tenotomy were observed. No problems with healing were seen after the tenotomy, even in the oldest patients with age 15 year. Repeat Achilles tenotomy was required in 10 feet due to incomplete initial correction of equinus in 4 and recurrence of equinus in 6 feet. All of the parents were satisfied with the treatment offered to their child as appearance of the feet had been improved and children were able to wear normal shoes for the first time in their lives. Dynamic supination was present in four feet, but caused minimal disturbance of gait and hence was not treated.

Discussion

Neglected clubfeet deformity is a common problem in developing countries, like ours due to lack of awareness, poverty, insufficient medical facility and maltreatment. It cause considerable physical, social, psychological and financial burdens on the patient and their families [3,4]. The treatments of neglected clubfoot deformity in the past have been extensive soft tissue release surgery, osteotomies, and various types of fixators or arthrodesis. Long term results of these surgical procedures have shown poor results with complications like painful feet, arthritis, stiffness of ankle and subtalar joint, and residual deformity [5,6,13-15].

A few studies, evaluating the use of Ponseti method in children with neglected clubfeet have shown promising results [6-9,16]. We have been treating the elder child of neglected CTEV with Ponseti manipulation and cast for years, but inspired by these series we also tried to review and evaluate our results of correction of clubfeet deformities in 32 feet (23 children) in walking age child with mean age 3.4 years (range 1 to 15) treated by Ponseti manipulation, retrospectively.

Fig 2. Pre (a) and post correction clinical photography (b & c) and x rays (d) of foot lateral view of CTEV case of age 15 years showing correction but with small size foot

In our study, mean pre-correction Pirani score of 4.51 improved significantly to mean of 0.55 post-correction ($p < 0.001$), which was in accordance with the reported series of Lourenço et al, Verma et al, Khan et al, Spiegel etc [6-9,16,17]. The mean number of casts in our study was 9.2 weekly casts, whereas is compared to studies by Khan et al (12.1 mean cast) and Verma et al (10 mean cast) [7,8]. But Lourenço et al due to the reason that they treated with biweekly casts mean number of cast was higher in their series [6], but it showed that weekly cast was as effective as biweekly cast. We also found that the higher the age at presentation higher number of cast are used to correct the deformity.

Since dorsiflexion is most difficult to achieve, especially in older children, which requires percutaneous tentomy, hence we performed percutaneous tendoachilles tenotomy in all cases, which healed uneventfully in all cases even in an oldest patient with 15 year age. Further a repeat tenotomy was also required in 10 of our case for recurrence of equinus deformity without any open soft tissue release surgery.

Although, in our series we achieved painless, plantigrade, and cosmetically acceptable feet in all the cases, but the size of the foot even after correction remain bit smaller. This is probably because in older child towards the skeletal maturity, bony correction is difficult and soft tissue correction by casting results in a normal shaped foot but smaller foot. Bone could not remodel fully even though the foot gets corrected. The talar dome and naviculus remained flat and triangular respectively. This poor remodelling of bones of feet in such old patient may have resulted in persistence of small sized foot (fig 2).

We have also observed that above knee plaster casts and abduction brace were poorly tolerated especially by older children that could have been a risk factor for noncompliance and failure of treatment, but this issue had been dealt with adequate and proper parent's education and counselling. Despite these difficulties, the patients and parents were satisfied with the results.

Conclusion

Ponseti`s method is a safe, effective and inexpensive method for correction of deformity even in neglected clubfeet deformity child presenting after the age of walking, however, our study is small and further studies will be necessary to understand the effectiveness of this method fully.

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Hypovitaminosis D In Elderly Patients Presenting With Fractures

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Abstract

Background: Vitamin D deficiency is seen in all races, age groups and ethnic backgrounds. It is estimated to affect more than one billion people worldwide. This study was done to find out vitamin D levels and its associated factors among elderly patients presenting with fractures.

Material and method: This cross-sectional study was performed at our tertiary care hospital, in patients above 45 years, presenting with fracture as a result of trivial trauma. In all patients serum 25(OH)D level was measured. A level of serum 25(OH)D < 10 ng/ml was labeled as the deficiency, between 10 to 29 ng/ml as insufficient and ≥ 30 ng/ml as sufficient.

Results: A total of 102 patients were included in our study with mean age of 60.8 ± 13.4 years, out of which 60 were males and 42 females. Mean serum 25(OH)D level in our study population was 15.82 ± 5.88 ng/ml. We found 94.1% of the patients were having a low level of serum 25(OH)D i.e. less than 30 ng/ml, with 78.4% insufficient (between 10 to 29 ng/ml) and 15.6% deficient levels (below 10 ng/ml). Higher age, female, menopause and lack of sunlight exposure were found to be significantly associated with lower vitamin D levels.

Conclusion: This study gives us important inside of a high prevalence of hypovitaminosis D in elderly patients. Detection and prompt intervention of vitamin D deficiency at an early stage can be helpful in decreasing the fracture in these elderly.

Keywords: Vitamin D deficiency, Serum 25(OH)D, Hypovitaminosis D, Ageing.

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Introduction

Vitamin D is very important for the musculoskeletal health as well as overall wellbeing. Apart from rickets in children and osteomalacia in adults, vitamin D deficiency has been associated with pain and muscle weakness [1,2]. Inadequate serum vitamin D is also associated with secondary hyperparathyroidism leading to increased bone turnover and bone loss, resulting in increased risk for fractures especially in the elderly and postmenopausal women, even with minimal trauma [2-4]. Studies have documented the benefits of vitamin D supplementation in fracture reduction [5].

Sources of vitamin D in human body include diet and sunlight. Vegetarian diet lacks in fish and animal protein, which are important source of vitamin D. Further, food product available in market unlike western countries, are not fortified with vitamin D or even calcium. Few food toxins like phytates which are common in vegetarian diet make this situation more complicated by preventing the absorption of calcium from gut and further misbalancing the vitamin D-calcium homeostasis in body [6]. The study among Caucasian population have proposed a 10 minutes exposure of sunlight over, head and

arms three times per week would be adequate to prevent vitamin D deficiency [4]. But same cannot be said in reference to Indian population where most of people are either wheatish or brown-black, having more melanin, preventing UV rays from sunlight to react with vitamin D precursor in skin. Studies in Indian settings have documented the need for larger contact period that too daily, for the successful reaction [7].

Due to these reasons, Vitamin D deficiency is quite prevalent in Indian subcontinent, with a prevalence of 66%–91% among various populations [8-10]. Elderly citizens are especially at higher risk of vitamin D deficiency primarily because skin and gut are now less efficient in producing and absorbing vitamin D and immobility among them decrease the sunlight exposure [4]. While the handfuls of studies are done on postmenopausal women with fractures, very few have studied the role of vitamin D among elderly. Given the importance of vitamin D in overall wellbeing as well as deficiency leading to fracture, data enlightening the prevalence of vitamin D deficiency in elderly patients may be of great value. Therefore we conducted this study to find out the prevalence of hypovitaminosis D and related factor among elderly patients sustaining fractures with trivial injury.

Material and Methods

This cross-sectional study was conducted over a period of 12 month duration from January to December 2015 at our center after approval from Institutional Ethics and Research Advisory Committee and informed consent from each participant. Our city is a district place in north India, which receives daily sunlight for not less than 10 hours throughout the year and natives of our place have skin complexion of wheatish to dark in color. Most of our patients belong to rural populations involved in agriculture, who are exposed to long duration of sunlight, that too with minimal clothing [11].

All patients with more than 45 years age presenting with fragility fracture to hip and wrist caused by trivial trauma were included in the study. Patients with deranged kidney function or renal calculi, abnormal thyroid function, liver disease, history of esophageal disease, peptic ulcer or cancer or taking long-term therapy like estrogen replacement therapy/corticosteroids/anticonvulsants/anticoagulant/glucocorticoid were excluded from the study.

All study subjects were admitted in orthopedic ward, with detailed history followed by physical examination. A pre-designed questionnaire covering various risk factors was used to collect data from these subjects. For estimation of vitamin D levels, we measured pro-hormone 25-hydroxyvitamin D [25(OH)D], rather than the measurement of serum 1,25$(OH)_2$D concentrations, as former is shown to related with vitamin D deficiency. For this Vitamin D estimation, 4ml blood sample of the subject was collected in ice-cooled syringes and maintaining proper cold chain was send to endocrinology lab earliest. At endocrinology lab, quantitative determination of total serum 25(OH)D was done by direct competitive chemi-luminescence immunoassay (CLIA) methodology from serum after centrifugation at 1200 rpm for 10 minutes. For our study, Vitamin D less than < 10 ng/mL, between 10–29 ng/mL and more than 30 ng/ml was considered deficiency, insufficiency and sufficient respectively [12,13].

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) Version 20. The categorical variables were represented by percentage (%) along with 95% confidence interval and continuous variables were expressed as mean with standard deviation. The statistical significance was tested by unpaired t-tests for independent as well as Analysis of Variance (ANOVA), wherever applicable with Bonferroni test for post-hoc assessments to identify the groups that are homogenous with respect to mean. All tests were two tailed and a p value of ≤ 0.05 was considered significant.

Results

A total of 102 patients were included in the study, out of which 60 patients (58.8%) were male while rest 42 (41.2%) females. Overall

mean age was 60.8 ± 13.4 years (range 45 to 92 years), with mean age of male being 60.1 ± 13.7 years while that of female was 61.6 ± 13.1 years. Among them 54.9% were urban residents while 45.1 % were living in rural area. Majority of population were married (83.3%) and Muslim by religion (59.8%). None of the participants reported use of sunscreen ever. 34 patients presented with intertrochanteric fracture, 66 with fracture neck of femur while 2 patients presented with distal radius fracture. None of the patients had been investigated for vitamin D level or received treatment for osteoporosis in past.

The mean level of serum 25(OH)D was 15.82 ± 5.88 ng/ml. Out of 102 cases included in the study 6 (5.8%) patients were in sufficient range (>30 ng/mL), while rest 94.2% were classified as either deficient or insufficient level. Eight patients (78.4%) were insufficient (between 10-30 ng/mL) and 16 patients (15.6%) patient were deficient in serum 25(OH)D (< 10ng/mL) (Table 1 & Fig. 1).

Figure 1: Patients as per to Vitamin D level

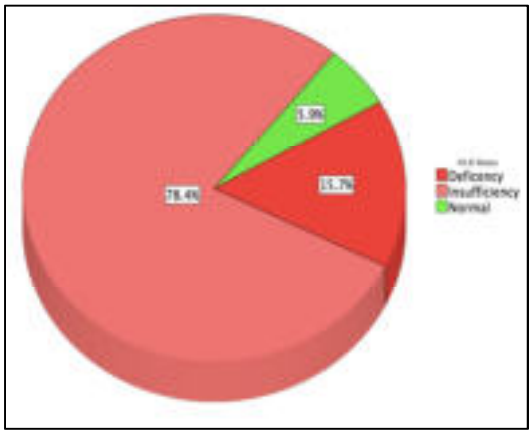
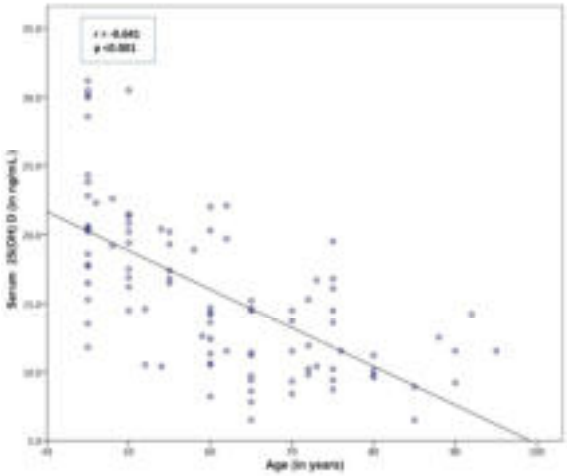


Figure 2: Age Vs Vitamin D levels



When compared the age in groups, the means age in deficient group (72.9±8.9 year) was higher than insufficient group (59.4±12.9 year) and normal group (45.8±2.0 year), and this was statistically significant (F = 13.352, df 2, p <0.001). On Post Hoc analysis using Bonferroni test, a significant difference was found between means of age with deficient group and insufficient group (mean difference = 13.5, p <0.001), deficient group and normal group (mean difference=27.1, p <0.001) as well as insufficient group and normal group (mean difference=13.6, p = 0.026). Thus higher age was significantly associated with vitamin D deficiency as well as insufficiency levels (Fig. 2).

Means of vitamin D level in males (17.43 ±6.39) was higher as compared to females (13.50 ± 4.14) and this was significant when we analyzed by independent t test (p<0.001). Females who had not attained menopause were having significantly higher means of vitamin D level (17.41±3.22) then those who had attained menopause (12.58±3.81, p value-0.002). When we compared religion and residence of patients with the vitamin D levels, we did not found significant relationship between means of them. Although patients who gave history of daily sunlight of 15 min or more were having significantly higher levels of vitamin D levels (16.45±6.06) in comparison to those who did not (12.60±3.55) (p value - 0.001) (Table 2).

Discussion

Vitamin D plays important role in calcium metabolism. Indians owing to cultural, religious and ethnic variation from western world are more prone to low level of vitamin D [2-4]. Most of the epidemiological researches of level of Vitamin D in fracture patients are from western countries. Hence we studied vitamin D levels and its associated factors among elderly patients presenting with fractures in 102 Indian patients and observed very high prevalence (94.1%) of hypovitaminosis D, with prevalence of insufficiency in 78.4% and deficiency in 15.6% of cases.

Table 1: Status of Vitamin D levels in study population.

Serum Vitamin D status	Frequency	Percentage	95% CI
Deficiency (<10 ng/mL)	16	15.7	9.8 – 24.1
Insufficiency(10–29 ng/mL)	80	78.4	69.4 – 85.4
Sufficiency (30–100 ng/mL)	6	5.9	2.5 – 12.5
<20 ng/mL*	77	75.5	66.3 – 82.7
<12 ng/mL#	35	34.3	25.8 – 44.0

Table 2: Association of Vitamin D levels with various variables

Variables		Freq.	Vitamin D level		t	df	p value
			Mean	SD			
Sex	Male	60	17.43	6.39	3.766	99.5	<0.001
	Female	42	13.50	4.14			
Menopause	Not attained	8	17.41	3.22	3.311	40	0.002
	Attained	34	12.58	3.81			
Religion	Hindu	41	16.84	4.87	1.461	98.5	0.126
	Muslim	61	15.11	6.42			
Residence	Rural	46	16.43	5.60	0.962	100	0.338
	Urban	56	15.30	6.11			
Sun exposure (<15 min/day)	Inadequate	17	12.60	3.55	-3.550	37.6	0.001
	Adequate	85	16.45	6.06			

While there is no generalize consensus on optimal levels of serum 25(OH)D for deficiency and insufficiency, most researchers considered more than 30 ng/ml as sufficient level [6,7,12]. Lips et at has classified vitamin D deficiency at level of less than 20 ng/ml among Caucasian, but at the same time stressed that cutoff for these levels should be based on population studies and level which triggers secondary hyperparathyroidism [4,13]. Studies among Indian patients with hip fracture found prevalence of vitamin D deficiency (taken by them as <20ng/ml) at 76.7% in Delhi and 74% in South India[14,15]. If we take similar cut-off point in our study, 75.5% of patients had 25(OH)D levels less than 20ng/ml.

International studies assessing prevalence of vitamin D deficiency according to National Osteoporosis Society criteria (< 12 ng/mL), found it as 50% among US postmenopausal women with hip fracture and 78% among German vertebral fracture patients (compared to 34.3% in this study with same criteria) [16,17]. Another study done in US, among Caucasian presenting with minimal trauma fracture, documented similar 97.4% prevalence of hypovitaminosis D (<30 ng/ml) [18]. Although there is no universal consensus to what constitutes subnormal concentrations of vitamin D, most of literature shows a higher prevalence of hypovitaminosis D in fracture patients, because it is major reason of weak bones leading trivial trauma to cause fracture.

Studies have shown that when serum 25(OH)D levels fall below 30 ng/mL, calcium absorption decreases and it leads to secondary hyperparathyroidism, resulting in resorption of the calcium from bone in order to maintain serum calcium within normal range [7]. This secondary hyperparathyroidism may lead to weak and fragile bone, and further to fracture by trivial trauma. This is the same reason why studies have recognized serum 25(OH) D < 30 ng/ml be used as the cut off value for vitamin D insufficiency [4,7,19,20].

We observed the low levels of vitamin D to be significantly associated with advancing age, females, especially those who have attained menopause, and among inadequate sun exposure. Previous studies have documented elderly and postmenopausal women as risk factor for fracture [4,5] similar to our study but prior studies had conflicting results in regards to advancing age. Although higher prevalence of vitamin D deficiency among elderly and with each decade has been demonstrated by Bhat et al and Arya et al [21,22], but Marwaha et al and Narang et al in their study among health adults did not found any relation with advancing age [8,23]. Although few researches had found hypovitaminosis D irrespective of gender, majority are in notion of this being commoner among menopausal females [8-23]. Female gender, especially from north Indian population, by virtue of various customs and culture, often stay at home with minimal chances of sun exposure, and whenever they go outside, are fully or maximally covered, decreasing the chance of sunlight exposure. Application of sunscreen, which is common in female, reduces the chances of adequate UV rays penetration in skin.

Studies have proposed minimum duration of daily 30 minutes of sun exposure is required for adequate production of vitamin D [7,15,23], although in our study this was even lesser. We observed daily exposure of 15 min of sunlight is significantly associated with higher level of serum vitamin D.

We did not observe residence and religion to have a significant effect on serum vitamin D level in our study population. Both rural and urban population as well as Hindu and Muslim, had almost similar mean of serum vitamin D level as of the mean study group, although all were in insufficient range, confirming the widely prevalent of vitamin D deficiency among various socioeconomic groups, different ethnicities, rural and urban areas as well as different professions as other have measured [7]. Therefore all older people irrespective of their ethnicity, residence or professions, need to be monitored for hypovitaminosis D and Vitamin D supplements to be given to them, which will help in resisting fracture, not only by strengthen the bone to survive trivial fall but also in averting the chances of fall by strengthening the proximal muscle [19,20].

Conclusion

With such high percentage of prevalence of vitamin D deficiency/insufficiency in elderly fracture population, we should thought toward it prevention to prevent the occurrence of fracture. Oral vitamin D supplement should be advocated as first line defense to all. Along with being fit and healthy, promoting outdoor activities would serve as a good public health measure in increasing the serum vitamin D levels.

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Objective Evaluation Of Tendon Morphology By Ultrasonography In Treatment Of Recalcitrant Tennis Elbow By Autologous Platelet Rich Plasma

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Abstract

Background: Traditional therapies of tennis elbow have shown inconsistent outcomes as they do not deal with poor tendon healing properties secondary to poor vascularization. Local platelet rich plasma injections, which provide locally high concentration of growth factors, have shown its efficacy in treatment of tennis elbow on a subjective basis only.

Material and methods: We tried to measure the efficacy of locally injected autologous PRP, subjectively by functional oxford elbow score and pain score as well as objectively by ultrasonographic evaluation of the morphologic changes (focal hypoechoic, odema, tendon thickness, fraying, tear, cortical erosion, calcification) in common extensor origin in 30 patients with mean age of 39.3 years of recalcitrant tennis elbow.

Results: The mean pain VAS Score improved from 7.7 before injection to 1.8 at final follow up i.e. after 6 months post injection. The Oxford elbow score improved from a mean of 19.2 prior to treatment to 41.3 after the injection at final follow up. 6 months post injection ultrasonography of the involved elbow showed decrease in focal hypoechoic, decreased edema, and improvement in thickness of the tendon and healing of the tear at the origin site.

Conclusion: This study confirms that local PRP by supplying growth factors helps to enhance the stromal and mesenchymal stem cell proliferation and increases tendon vascularity and prevents angiofibroblastic degeneration and thus improves tendon repair and healing property by releasing growth factors and increasing vascularity, which can be documented by improved tendon morphology.

Keywords: Tennis elbow, Platelet rich plasma, Ultrasonography

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Introduction

Tennis elbow is treated non-operatively by rest, anti-inflammatory drugs, brace, physical therapy or by local intralesional injections of corticosteroid, dry needling or by surgical techniques [1,2]. But these therapies do not alter the common extensor tendon's poor healing properties secondary to poor vascularization of tendon, which is the basic pathophysiology in tennis elbow [3]. Hence these traditional therapies have shown inconsistent outcomes.

Recently, platelet rich plasma (PRP) an autologous biological product containing high concentrations of platelet derived growth factors has shown promising results in chronic tendinopathies, when injected locally [4-

7].Various series and RCTs have shown the efficacy of PRP in treatment of tennis elbow and the advantage of PRP over the corticosteroid injection [8-22]. But all of these studies have assessed the outcome on a subjective basis only and these series lack objective evidence of the improvement of the healing of the tendon. Ultrasonography of common extensor tendon can be used objectively to document the severity of lateral epicondylitis [23,24]. Hence, we tried to measure the efficacy of locally injected autologous PRP for treatment of recalcitrant tennis elbow, functional by Oxford elbow score as well as by ultrasonographic evaluation of the morphologic changes in common extensor origin at the lateral epicondyle before and after the injection, to document outcome objectively.

Material and method

Patients presenting with clinical signs and symptoms of lateral epicondylitis and refractory to the conventional treatment for 3 months, fulfilling the inclusion and exclusion criteria, were treated by local autologous platelet rich plasma (PRP) injection and were included in the study. The study design was approved by the ethical committee of the institution and written consent was obtained from all the participants.

All patients coming to the OPD with pain and tenderness localized to lateral epicondyle with positive Cozen test, Mills test and/or Maudslay's test along with or without restriction of forearm rotation were diagnosed to be patients of lateral epicondylitis or tennis elbow. These patients were initially given oral anti-inflammatory and analgesic treatment along with elbow brace and physiotherapy in form of exercises, deep tissue massage and ultrasound therapy. Patients not responding even after 3 months of conservative treatment were labelled as the recalcitrant cases and were included in the study. Patients older than 60 years, with bilateral involvement, symptoms of carpal tunnel syndrome or cervical radiculopathy, systemic disorders (diabetes, rheumatoid arthritis, or hepatitis) or who had undergone surgery or local corticosteriod injection in the past 6 months or with local skin disease at elbow were excluded from the study.

Patients in the study were investigated with complete blood count, blood urea, serum uric acid, blood glucose levels, rheumatoid factor, liver function test and ESR. Range of motion was assessed and radiographs of the involved elbow were taken to rule out other elbow pathology.

Ultrasonography of the involved elbow was also done to evaluate tear at the common extensor origin, focal hypoechoic, oedema, cortical erosion, calcification, thickness and fraying of the common extensor tendon and probe induced tenderness and was compared with normal elbow. Pre injection pain score (visual analogue scale) and Oxford elbow score were calculated.

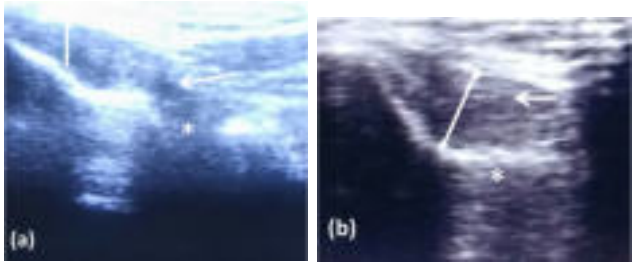
10 ml of autologous blood was collected in an acid citrate dextrose vaccutainer and was passed through a two stage centrifuge (first stage at 1600 rpm for 15 minutes for separation of erythrocytes, and the next stage at 2800 rpm for 7 minutes in order to concentrate platelets)to separate the blood into three layers. The lower most layer contain erythrocytes and leukocytes, the middle buffy layer contains most of the platelets with platelet concentration of 1,227,000 ± 250,000/µl (i.e. 4-6 times the average normal values) and the uppermost layer contains mostly plasma. The middle buffy layer of the platelet concentrate was collected in a sterile syringe.

Under all aseptic precautions, 1 ml of PRP was injected at the most tender point over the lateral epicondyle of the humerus by peppering technique. After injection, patients were rested for 30 minutes and were advised against massage or hot fomentation. Ice packs and paracetamol were advised for discomfort rather than non-steroidal anti-inflammatory drugs, as the latter may interfere with platelet function.

Patients were regularly followed at 2 weeks, 6 weeks, 3 months, and 6 months. Post injection patient's outcome was re-assessed

using the visual analogue scale (VAS) for pain and Oxford Elbow Score. Ultrasonography of the involved elbow was performed again at final outcome of 6 months by an experienced musculoskeletal sonologist to re-evaluate for tear at the common extensor origin, oedema at the common extensor origin, cortical erosion, probe-induced tenderness, and thickness of the tendon. All the gathered data was tabulated and statistical analysis done.

Fig. 1 Longitudinal USG of patient of tennis elbow pre-injection (a) showing focal hypoechoic (white arrow), mild tear at origin(asterix), fraying & thinning of the common extensor tendon. 6 months post PRP injection (b) USG showing reduced focal hypoechoic with increased in thickness of tendon (5.6mm) and healin in the tear at the origin.



Result

30 patients with mean age 39.3 years (range 25 to 58) of tennis elbow were included in the study. Out of these 22 (73%) were female and 8 (27%) were male.24 (80%) of the patients of tennis elbow had complains in right elbow with right to left ratio of 4:1.Most of our patients had right dominance i.e. 23(76%) patients. None of the cases had bilateral involvement. The mean duration of symptoms was 7.2 months (range 5 to 13 months).

The mean pain VAS Score improved from 7.7 before injection to 5.4 after 2 weeks, 4.1 after 6 weeks, 3.2 at 12 weeks of injection and 1.8 at final follow up i.e. after 6 months post injection, respectively. At the initial presentation, out of the 30 patients, 19 patients had severe pain whereas 11 patients had moderate pain before injection, which improved to only 3 patients having moderate pain and none of the patients having severe pain at elbow at final follow up after the injection. 27 patients had either no or mild pain only at the lateral elbow (table 1).

Very severe to severe tenderness at the lateral epicondyle of elbow prior to injection was seen in 28 (93%) patients, which improved to, none of the patients having severe or very severe tenderness and 28 (93%) patients having either no or only mild tenderness at the lateral elbow at final follow-up (fig 1a & b).

The functional outcome as assessed by the Oxford elbow score improved from a mean of 19.2 prior to treatment to 41.3after the injection at final follow. Pre injection elbow score was worst to severe in 28 patients, whereas, at final follow up 23 patients had elbow score as normal or mild i.e. between 40 to 48 and 6 patients had oxford elbow score between 30 to 39.

Prior to injection 6 patients had restriction in the forearm rotation less than 160 degree. At final follow-up all the patients had normal range of motion. Prior to injection, ultrasonography of the involved elbow showed tear at the common extensor origin in 18, oedema in 14, cortical erosion in 24, calcification in 4, thinning and fraying of the common extensor tendon in 6 and probe induced tenderness in 29 patient(fig 1). Focal hypoechoic in the deep part of common extensor tendon was seen in 26 patients before injection, whereas only 6 patients showed these focal hypoechoic in deep common extensor tendon after 6 months of the injection, indicating the evidence of healing in the tendon. At final follow up only 7 patients had ultrasonographic evidence of tear at common extensor origin, oedema in 2 patients, cortical erosion in 24, 2 patients had thinning and fraying of common extensor origin, and probe induced tenderness was seen in only 6 patients (table 1).

Two patients came up with complaints of post injection pain and swelling at injection site at one week after the injection and one patient came up with fever, both of these complaints were relieved by analgesics and antibiotics medications respectively. None of the patients showed any other complication, like infection, neurovascular change or worsening of epicondylar pain.

Table no. 1 –Results of the patients of tennis elbow after autologous PRP injection

Parameter	Grading	Pre-injection	Post – injection			
			2 week	6 week	12 week	6 month
Pain (VAS score)	No (0)	0	0	1	2	8
	Mild (1-2)	0	2	11	20	19
	Moderate (3-6)	11	26	18	8	3
	Severe (7-10)	19	2	0	0	0
	Mean VAS score	7.7	5.4	4.1	3.2	1.8
Tenderness	No or mild	0	3	12	25	28
	moderate	2	8	16	4	2
	Severe	22	18	2	1	0
	Very severe	6	1	0	0	0
Oxford elbow score	0-19(worst)	19	4	1	1	0
	20-29(severe)	9	15	8	2	1
	30-39 (moderate)	2	10	16	16	6
	40-48 (mild to normal)	0	1	5	11	23
	MEAN OES	19.2	28.6	32.4	39.6	41.3
USG of common extensor	Tear	18	-	-	-	7
	Oedema	14	-	-	-	2
	Thinning and fraying	6	-	-	-	2
	Probe induced tenderness	29	-	-	-	6
	Cortical erosion	24	-	-	-	24
	Calcification	4	-	-	-	4
	Focal hypo-echoic	26	-	-	-	6
Range of motion	90^0-110^0	1	0	0	0	0
	110^0-130^0	5	2	0	0	0
	130^0-150^0	24	28	30	30	30

Discussion

Lateral elbow epicondylar tendinosis or tennis elbow (TE) is very common condition among persons performing activities involving strong gripping and repetitive wrist extension [1,2]. Lateral epicondylitis is usually a misnomer because microscopic evaluation of tendon does not show signs of inflammation. It has been well proven histologically that lateral epicondylitis or tennis elbow is not an acute inflammatory pathology, but instead it is failure of the normal tendon repair mechanism along with angiofibroblastic degeneration because tendons are relatively hypovascular. This hypovascularity may lead to hypoxic tendon degeneration which is main aetiology of tendinosis [3,24,25].

The traditional methods to treat tennis elbow, including rest, anti-inflammatory medications, bracing, physical therapy, ionotophoresis, extra corporal shockwave, botulinum toxin, and corticosteroid injection, do not alter the

tendon's poor healing properties secondary to poor vascularization of tendon, which is the basic pathophysiology in tennis elbow [1-3]. Hence these methods have shown inconsistent outcome.

Autologous biological blood-derived product PRP releases high concentrations of platelet derived growth factors on injection which enhance tendon healing due to its effects on angiogenesis and collagen synthesis. Various growth factors and cytokines in PRP include Platelet Derived Growth factors (PDGF-aa, PDGF-bb, PDGF-ab),Vascular Endothelial Growth Factor (VEGF),Fibroblast growth factor (FGF), Epidermal Growth Factor (EGF), Transforming Growth Factor beta (TGF-b1, TGF-b2), Insulin Like Growth Factor-1 and 2

(IGF-1, IGF-2), Interleukin – 8 (IL-8), Keratinocyte Growth Factor, Connective Tissue growth factor. The role of PRP in bone, wound and tendon healing is well established [27-29].

Recent literature is saturated with articles on the efficacy of PRP in treatment of tennis elbow. Various studies by Mishra et al, Hecthman et al, Tan et al, Palacio et al have already confirmed the efficacy of the PRP in treatment of tennis elbow [8-13]. Several studies have even compared the efficacy of PRP with corticosteroid injection or with whole blood injection like Gosen et al, Peerbooms et al, Krogh et al, Lediedzinski et al, Raeissadat et al, and Thanasas et al [13-22]. All of studies confirmed the efficacy of PRP injection and showed the advantage of PRP over the corticosteroid injection or whole blood.

But all of the studies have measured the results in terms of the pain relief as assessed on the VAS score or as assessed on the improved in functional elbow scores like Mayo, Oxford, Nirschl score etc. But both these parameter pain as well as the functional elbow score are subjective in nature and lack to give objective evidence of healing of the tendon and are thus subject to bias.

Ultrasonography of the tendon enables to visualize the tendon structures around the elbow [23,24]. Thus changes in the USG finding of the common extensor origin before the injection and after the injection can give the documented evidence of the improvement in the pathology of the tendon. Hence we tried to document the efficacy of the local autologous PRP injection in treatment of tennis elbow by pain relief as assessed by VAS score, improvement in functional elbow score as assessed by Oxford elbow score and to objectively document the improvement by seeing the changes in USG findings in the common extensor morphology so that we can get an objective evidence of the healing and improvement.

Our results subjectively as well as objectively confirmed the efficacy of the autologous PRP injection in the treatment of relcalcitrant tennis elbow as there is improvement in VAS score, Oxford elbow functional score as well as improvement seen in the sonographic appearance of the morphology of the common extensor tendon origin after the local autologous PRP injection as seen as decrease in focal hypoechoic, decreased edema, improvement in thickness of the tendon and healing of the tear at the origin site. Thus this study confirms that local PRP by supplying growth factors helps to enhance the stromal and mesenchymal stem cell proliferation and prevents fibrous scarring of the tendon. This increase in tendon vascularity by PRP prevents angiofibroblastic degeneration due to hypovascularity of the tendon, which is the main pathophysiology in tennis elbow. This locally injected PRP has led to improved tendon repair and healing property by releasing growth factors and increasing vascularity, which can be documented by improved tendon morphology. This study is limited by lack of randomized group, a relatively smaller sample size and short follow up period.

Conclusion

PRP is an effective mode of treatment for recalcitrant tennis elbow, as it has tendency to enhance the healing potential of the hypovascular tendon by releasing high concentration of growth factors and this improvement has been documented subjectively by improvement in elbow score and objectively by improved tendon morphology on ultrasonography.

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Eight Plate Hemiepiphysiodesis In Genu Valgum: A Retrospective Study

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Investigation preformed at Department of Orthopaedics, Bundelkand Medical College, Sagar (M.P.), India

Abstract

Background: Angular deformities of distal femur can be treated with corrective osteotomies and skeletal fixation. In children, this major intervention can be avoided with temporary hemiepiphysiodesis. Recently, a new implant called the eight-Plate, consisting of a two-hole plate and two screws, is popular as an alternative to the Blount staple to perform temporary hemiepiphysiodesis in children.

Materials & Methods: Fifteen patients (16 physes, 16 limbs) were identified retrospectively in between November 2012 to September 2017 who underwent eight plate surgical growth modulation with average follow-up after plate insertion of 2 years 2 months (range, 1 year 6 months to 2 years 6 months).

Results: Average age at eight-Plate implantation was eleven years three months (age range, 9 years 8 months to 13 years 6 months). Eight-plates were inserted for an average 14.0 months (range, 11.0–20.4 months). No growth disturbance was observed. Mechanical lateral distal femoral angle changed an average 10.00 degrees (range, 7–18 degrees) or 0.4 degrees/month.

Conclusions: The eight-Plate effectively treats angular deformities in growing children and is less likely to extrude spontaneously than the Blount staple. We have not observed growth disturbance or other complications related to this device.

Keywords: Eight-Plate, Guided growth, Hemiepiphysiodesis

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Introduction

Angular deformities around knee, varus or valgus, is a common growth problem encountered in pediatric population, which may often be managed expectantly with parental reassurance as most of them are physiological, which peaks between 3 and 6 years and resolve spontaneously [1,2]. Pathological angular deformities can be either idiopathic, metabolic or due to congenital syndromes such as skeletal dysplasia and when these pathological deformities of the lower extremities are of more than 10^0, they can cause activity-related pain, altered gait mechanics, joint instability and early degenerative arthritis [3].

Temporary hemiepiphysiodesis or guided growth by eight-Plate results in equal limb lengths, neutral mechanical axes, and horizontal knees by skeletal maturity without destruction of any part of the physis and allows the entire physis to resume growth after hardware removal. Hence we conducted this retrospective study is to evaluate the effectiveness of hemiepiphysiodesis with the eight-Plate to correct genu valgus deformity in paediatric patients.

Materials and Methods:

We retrospectively reviewed cases of genu valgum deformity, which were operated with eight plate hemiepiphysiodesis at our centre during 2012 to 2017. All patients of genu valgus deformity which were operated with eight-plate on medial surface between age 8 to 14 years for which plate removal has been done were retrospectively identified from the records and included in the study. Patients operated for genu valgus correction for skeletal dysplasia and in which plate removal had not been done were excluded from the study. Patients treated by other methods or whose medical records were incomplete were also excluded from the study.

The medical record was assessed for patient demographics, diagnosis, age, gender, follow up duration, duration of plate, removal time etc. Patients pre-operative, immediate post-operative and final follow-up full length AP x-rays were reviewed for measurement of deformity. These radiographs were evaluated for magnitude of the deformity by the measuring the lateral distal femoral angle (LDFA), medial proximal tibial angle (MPTA), mechanical axis deviation and the tibio-femoral (TFA) angles both before and after the deformity correction and implant removal.

Results:

Sixteen limbs in 15 patients fitted the inclusion criteria whose complete record was available and included in the study. There were 8 male and 7 female. The average age at the time of plate implantation was 11.3 years (range 9 to 13 years). The average time between insertion and removal of the plate was 14 months (range 11 to 23 months). Average follow-up period after the removal was 26 months (range 12 to 36 months). In all sixteen eight, plates were removed without any complications.

The mean pre-operative TFA was 22.41° (range 12° to 39°) which was corrected to mean angle of 6.7° (range 2° to 11°) at final follow up. The mean pre-operative LDFA was 73.17° (range: 63° to 84°) which was corrected to mean angle of 88.2° (range 83° to 91°) at final follow up. The mean pre-operative MPTA was 96.19° (range 53° to 107°) to mean angle of 90.1° (range 88° to 93°) at final follow up (fig 1 & 2). All cases were successfully treated; reaching full deformity correction with average speed of correction was 0.9°/month. Overcorrection was seen in 1 limb.

Fig 1. Preoperative X rays of both limbs (a & b) showing genu valgus bilaterally

Fig 2. Post-operative X rays (a & b) and clinical photos (c) after correction

Discussion:

Angular deformities of the knee alter the biomechanics of the knee by causing a distorted stress distribution on the weight-bearing surface of the knee joint and various methods have been proposed to address this problem [1-3]. Surgical treatment is recommended only after 8 years of age when it was clear that physiological recovery had

failed and when the deformity is more than 10° [4].

Treatment of these angular deformities ranges from osteotomies to hemiepiphysodesis. Osteotomies typical done in adults, involve extensive soft-tissue dissection, complications of wound closure, infection, delayed union, malunion and prolonged immobilization which increase the morbidity of the patients [4-6]. Hemiepiphysiodesis either permanent with physeal ablation or temporary using staple (s) or a tension band plate across one side of the physis are options done in growing child [7,8]. Permanent hemiepiphysodesis or staples which may cause permanent iatrogenic physeal arrest prevent their use in under the age of eight, due to fear of growth disturbances and shortening [9-11].

Less invasive method of hemiepiphysiodesis by application of eight-plate and growth modulation to restore alignment has advantage of lower cost and fewer complications. The only contraindication for this guided growth is physeal closure due to damage or to skeletal maturity [12-18]. We retrospectively reviewed our results of genu valgus correction by eight-plate in 16 limbs in 15 patients and found that we were able to correct the deformity all the patients, whereas overcorrection was seen in one patient.

Peter Stevens, the inventor of the eight-Plate, believes the eight-Plate works faster than the Blount staple because rigid staple produced more of a compressive effect [7,8]. The time for deformity correction is dependent on the width of the growth plate, with narrow growth plates correcting faster than wide ones [12]. The rigid Blount staple causes a technical narrowing of the growth plate, whereas the eight-Plate creates an angulation correction axis outside the growth plate, thereby "widening" the physis [13]. The speed of correction seems to decrease with age, and as a patient approaches skeletal maturity, the physis grows at a slower rate; hence this should be considered and taken into account during the timing of surgery [6]. This explains the mean slow correction rate (0.9°/month) achieved in our study compared to mean correction in others studies (1.53°/month) as the mean age in our study was higher (11.3 year) than mean age in other series (8.2 years) [14-18]. The shortcoming our study being retrospective and less number of cases can be overcome with a large, long-term, prospective study which would give the real incidence of rebound deformity from plate removal.

Conclusion

We consider the temporary hemiepiphysodesis with eight-Plate as very reliable solution for the treatment of pediatric angular deformities when the greater than 10° and there is time left before the physeal arrest.

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Role Of Threading Technique As An Alternative To Surgical Excision Of Baker's Cyst In Children

Varma HS, Pandey KK

Investigation performed at Department of Orthopaedics, Traumatology and Rehabilitation, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India

Abstract

Background: Baker's cyst is synovial swelling, found in the popliteal fossa seen typically in adults. In children, it is relatively rare, which at times may require surgical excision, which has its own morbidity. We evaluated the results of threading technique in children having Baker's cyst.

Methods: 6 cases of age less than 15 years with baker's cyst who failed to respond to conservative treatment were treated by our threading and aspiration technique. Ultrasound was used to confirm the diagnosis.

Results: 6 male children with mean age of 10 years with failed conservative treatment for mean of 5.5 months were included in study. Mean aspirate of cyst was 12.5 ml and mean time of thread removal was 7.1 day. Swelling of Baker's cyst subsided in all cases in mean time to 6.4 weeks (range 6 to 8 weeks) completely without any recurrence at final follow of 1 year.

Conclusion: Threading technique is good alternative to surgical excision in treatment of baker's cyst in children, with advantages of easy, cost effective, low morbidity, day care procedure without loss to school days

Keywords: Baker's cyst, synovial cyst, threading technique

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Introduction

Baker's cyst or Poplital cyst is a well delineated fluid filled herniated synovial bursa, which is usual located is between tendons of medial gastrocnemius and semimembranosus in the posterior aspect of the knee that communicate with the knee joint [1]. It is also known as Morrent Baker cyst based on the name of British Surgeon Dr William Morrant Baker [2]. The cyst is commonly seen in the adult or older age groups with prevalence from 10% to 41% and is comparatively rare in the children with reported incidence from 2.4% to 6.3 % having male preponderance [3,4]. Most of the Baker's cysts are asymptomatic in children because of having no secondary pathology involved, and hence the treatment of the Baker's cyst in children is usually observation and about 70 % of cases resolve its own with the time in months or years [5]. But in few cases it increases in size to such extent that they become symptomatic and the child may have difficulty in squatting and cross leg sitting. For these symptomatic cyst, which do not resolve with the conservative treatment, surgical excision is recommended with ligature at the neck of bursa [6]. This surgical excision warrants hospitalization, loss of school days and morbidity. In view of this, we evaluated the simple technique of threading, a day care

procedure as an alternative to surgical excision of Baker's cyst in children.

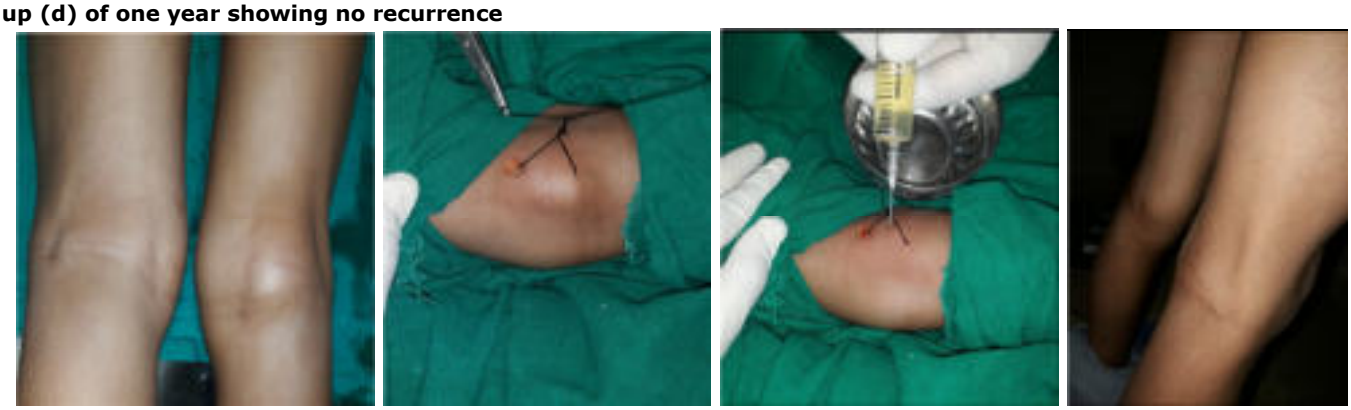
Material and Method

We retrospectively evaluated the results of threading technique of Baker's cyst done at our center. All children with less than 15 years age, with large cystic swelling in the popliteal fossa which was not responded to the conservative treatment in the form of observation and trial of aspiration and corticosteroid injection and which was treated by threading technique were included in study. Patients who were more than 15 year's age and who responded to conservative treatment were excluded.

All children were interrogated for complain of uneasiness in the joint, cosmetically and socially unacceptability of the swelling in posterior aspect of knee. Physical examination was done in prone position in extended knee and 45 degree flexed knee and reducibility of the swelling was also checked. Trans-illumination test was done to differentiate between solid and cystic mass. Ultrasonography was used to confirm the diagnosis of Baker's cyst and the child guardian were consented for minor procedure.

In prone position, after sterile painting and draping, the cyst was made more prominent by keeping the knee in extension. Initially the cyst was aspirated with 2 ml syringe to reconfirm the Baker's cyst as synovial cyst. After confirmation, Ethicon (number one) was passed longitudinally along the cyst medially protecting the neurovascular structures, which are placed laterally. The thread is tied outside the skin loosely keeping the loop long and free and the ends of suture kept long. Then cyst was then re-evacuated with 20 ml syringe and then sterile dressing was done. The fluid inside the cyst made to drain continuously from the sides of the sutures. Oral antibiotics and analgesics were given for 3 days. Dressing was changed in alternate day and continued till the dressing become dry. The thread was removed under aseptic precaution after the dressing became sterile (fig 1).

Fig 1 Clinical photograph showing Bakers cyst in left knee (a), threading technique (b), aspiration (c) and follow up (d) of one year showing no recurrence



Results

6 children were included in study after fulfilling inclusion criteria. All children were males. The mean age was 10 years (range 6 to 13 years). As per the patients all had uneasiness and for all the swelling was unacceptable cosmetically and socially. Swelling in all children was non reducible with positive trans-illumination test. The patients had received the conservative treatment for mean of 5.5 months (range 4 to 7 months).

Mean aspirate of cyst was 12.5 ml (range from 8 to 14 ml). The mean duration of dressing becoming dry was dressing 5.2 days (3 to 8 days). The mean time of thread removal was 7.1 day (range 6 to 10 days). Swelling of Baker's cyst subsided in all cases in mean time to 6.4 weeks (range 6 to 8 weeks) completely. Children were followed for 1 year with no recurrence. In one patient, there was superficial infection which subsided with antibiotics for one more week.

Discussion

Pathophysiology involved in Baker's cyst in adults is usually inflammatory or degenerative arthropathy like meniscal disorder (mostly medial meniscus), osteoarthritis, rheumatoid arthritis, villonodular synovitis or following infection [7,8]. But in children, it is usually idiopathic in 95 % of cases affecting, mostly children of 2 to 14 years of age [9,10]. It is also seen in children with hyper laxity joint disorder or juvenile rheumatoid disorder [11,12]. In children, it is also presumed that cyst starts, after trivial trauma to posterior aspect of the knee. There is controversy regarding communication of the cyst with the knee joint [13].

Ultrasonography is the investigation of choice for the diagnosis of the most cases of Baker's cyst although in few cases MRI may be recommended to rule out parameniscal cyst, cystic malignancies like fibrosarcoma, synovial sarcoma, malignant fibrous histiocytoma and popliteal vessel aneurysm which are rarely seen in children and are usually seen in adults [14-16]. Pathogenesis of Baker's cyst depends upon the presence of the valve between the tendons of medial gastrocnemius and semimembranosus muscle which open during flexion of the knee and closes during extension of the knee. There is also pressure variation in the knee from -6 mm Hg during partial flexion to 16 mm Hg during extension [17]. Baker's cyst protects knee joint from high effusion pressure by diverting fluid from knee to Bakers cyst with valve like mechanism that allow flow in only one direction [18]. Treatment of Baker's cyst in adults needs addressing of the primary pathology for its successful treatment [19]. Excision is recommended when conservative therapy fails. But excision has high rate of recurrence ranging from 5 to 40% and in children it can result in loss of school days due to hospitalization and morbidity. Further, since in children the cyst is mostly of primitive origin only, when the cyst failed to respond to conservative therapy, threading technique can be used. We used this threading technique, in 6 children of baker's cyst as an alternative to surgical excision. In all the cases swelling of Baker's cyst subsided in all cases in mean time to 6.4 weeks completely, without any recurrence when followed till one year. The thread technique along with aspiration, decompress the cyst and with the tract of the thread the cyst is decompressed continuously which needs regular dressing, and in the meantime, the thread causes inflammatory reaction and fibrosis to occurs to seal of the cyst, and hence preventing recurrence. With success our results we can say that the procedure is easy, day care procedure without much morbidity, can be done minimal invasive, cost effective, reliable, without recurrence and with good results. Our study is limited by short sample size.

Conclusion

Threading technique had shown good results with no recurrence rate as an alternative to surgical excision in treatment of baker's cyst in children, with advantages of easy, cost effective, low morbidity, day care procedure without loss to school days.

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Patterned Osteomyelitis Caused By Rubber Band

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Investigation performed at Department of Orthopaedics, Mahatma Gandhi Memorial Medical College & Maharaja Yashwantrao Hospital, Indore (M.P.), India

Abstract

Background: Circumferential foreign bodies left for prolonged period can migrate and cause serious constriction bands, ulcers, discharging sinus, compartment syndrome or osteomyelitis. When it involves bones of forearm, it involves typically ulna on ulna surface and radius on radial surface only, which can be seen as patterned lesion on the x-rays.

Case report: We report successful treatment by early surgical exploration, of such a case of rubber band tied on the wrist of a child and was forgotten, which migrated deep into the bones causing typical patterned osteomyelitis of both radius and ulna.

Conclusion: We report this case to create general awareness regarding complications of such foreign bodies and to consider for prompt surgical exploration for foreign body removal on visualizing the typical signature patterned lesion of the bone involving the outer surfaces of the bones only.

Keywords: Rubber band, Osteomyelitis, Daga Syndrome

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Introduction

Unrecognized foreign bodies are focus for infection and when they are deep seated they can result in tendinitis, granuloma, deep infection and even osteomyelitis. Most common foreign bodies are wood, metal, plastic or glass [1]. Foreign bodies of circumferential nature like rubber band, animal hair, cloth, thread etc are tied on the forearm or wrist quiet commonly in India [2]. When these circumferential foreign bodies are left for prolonged period or are forgotten after applying, they can migrate and cause serious constriction bands, ulcers, discharging sinus and compartment syndrome [3]. On involvement of further deeper tissue and bones these circumferential foreign bodies can result in osteomyelitis involving typically ulna on ulnar surface and radius on radial surface only, seen as erosion of ulna and radius on medial and lateral surfaces only respectively. We report successful treatment by early surgical exploration, of such a case of rubber band tied on the wrist of a child and was forgotten, which migrated deep into the bones causing typical patterned osteomyelitis of both radius and ulna.

The purpose of reporting this case is to create general awareness regarding complications of such foreign bodies among surgeons to consider for prompt surgical exploration on visualizing the typical signature patterned lesion of the bone involving the outer surfaces of the bones only for foreign body removal.

Case report

A 4 year's female child presented to our tertiary centre with pain, swelling and discharging sinus on an old circumferential

scar at left wrist joint from 6 months. The pain was localized to the left wrist and hand, was moderate to severe and was associated with swelling at the wrist joint. She had fever on and off which was low grade. On history, her parents denied remembering any history of trauma to left wrist. She had taken treatment by a doctor at a local clinic, regularly for past 6 months with analgesics and antibiotics, but the complaints did not improve.

On inspection, there was circumferential healed scar mark at the wrist along with three discharging sinuses at the dorsolateral, dorsomedial and one on ventral aspect of the wrist on the scar itself. There was history of continuous pus discharge from the sinus tract for the past 5 months, which was although scanty, but did not subside even after antibiotics treatment given by a local surgeon (fig 1).

Fig 1 – Pre op clinical photographs volar view (a) & dorsal view (b) showing circumferential healed scar mark at wrist along with three discharging sinus.

On palpation the wrist was warm and tender. The movements of the wrist and fingers were grossly restricted and there was no active extension of finger, although some flexion of fingers was present. Passive movements were very painful. Distal pulsations were palpable for both radial and ulnar arteries. Sensory supply of the hand was normal except for diffuse hyperalgesia over palm. Colour Doppler of the left upper limb showed normal vascularity. Hematological examination showed leukocytosis with WBC count of 16000/mm3, sedimentation rate was 39 mm and C reactive protein was 3.5 mg/l.

Patient was having 1 month old previous x-rays of wrist with her, which revealed a small lytic lesion of the ulna more on the ulnar side, along with the periosteal reaction but the radius seemed normal (fig 2). Fresh x-rays were done, which showed osteomyelitis of both distal ulna and radius, with periosteal reaction and lytic lesion at both distal radius and distal ulna particularly on medial side of ulna and lateral side of radius (fig 3).

Fig 2 – 1 months old previous x-rays of wrist AP (a) & oblique (b) views showing small lytic lesion of the ulna particular on the ulnar side, along with the periosteal reaction but normal radius.

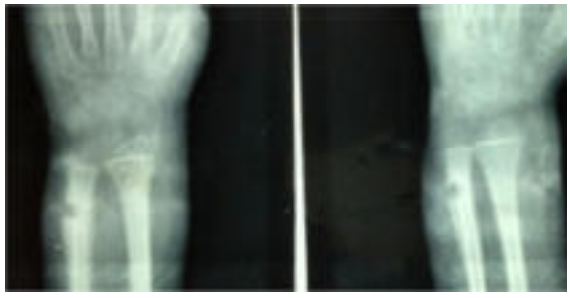
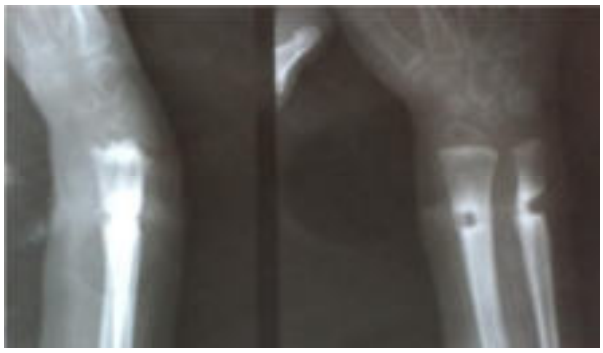


Fig 3 – AP (a) & lateral (b) X-rays at presentation showing osteomyelitis of both distal ulna & radius, with periosteal reaction and lytic lesion on medial side of ulna and radial side of radius.



On visualization, of this typical signature pattern osteomyelitis causing lesion on ulnar surface of ulna and radial surface of radius, we suspected some circumferential foreign body inside and we decided to explore the wrist immediately. Under tourniquet control and under general anesthesia, we explored the wrist via circumferential incision excising the sinus tracts and the previous scar completely. On exploration a circular rubber band was seen placed circumferential deeply buried under, which had caused the lytic lesion of the distal ulna on the ulnar side and distal radius on the radial side. This rubber band was removed and the osteolytic lesion of both radius and ulna was curetted (fig 4). Both the ulnar and radial vessels and the median and ulnar nerves were intact. The FDS and FDP tendons were intact but were kinked and compressed. On removing the tight rubber band, the flexor tendons got freed. The extensor tendons of fingers were found injured and were repaired end to end with Kessler's knot.

Fig 4 – Intra operative photograph of wrist showing circumferential rubber band acting as foreign body

Post-operatively, showing the removed rubber band to her parents, her mother recalled putting a religious thread along with elastic rubber band around child's wrist but didn't remembered anything regarding removal.

Post-operatively an above elbow slab with wrist and fingers in extension was given for 3 weeks, for healing of repaired extensor tendons.Intravenous antibiotics were given for one week following which oral antibiotics were prescribed for further six weeks. At final follow up, i.e. after one year of surgery, the patient recovered fully, all wounds healed well and patient regained normal movements of finger and wrists. The radiological examination showed healing of the lesion in both radius and ulna (fig 5).

Fig 5 – Clinical photographs (a to d) & X rays AP (e) & lateral (f) view at final follow up of 1 year showing full recovery and normal movements with wound & radiological healing

Discussion

In India, it is common tradition to tie thread, animal hair, cloth, rubber band or ring on the wrist or limb, in order to fulfill the wishes[1]. This tradition is equally prevalent for both adult and child. But in a child, since these are applied by the parent, relatives for fulfilling wishes or by quacks as a malpractice, these objects may be left for prolonged period, are sometimes even forgotten after applying. When these threads, band or hairs are left for prolonged duration, these can migrate inside the skin very slowly in a child's growing limb and can cause superficial or deep infection. Sometimes, it can migrate even deeper into the osseous region causing osteomyelitis as happened in our patient [2, 3].

When these circumferential foreign bodies, involve the underlying bones of forearm causing osteomyelitis, it involves typically ulna on ulnar surface and radius on radial surface only, which can be seen as patterned lesion on the x-rays i.e. showing erosion of ulna and radius on medial and lateral surfaces only respectively. Thus such type of osteomyelitis seen on x rays are the typical signature patterned osteomyelitis caused by the circumferential foreign body and are hallmark for the osteomyelitis caused by a circumferential foreign body. On viewing such type of signature patterned osteomyelitis on X-rays, it should be suspected of having some circular foreign body inside and it should be treated surgically promptly by exploration to remove the foreign body.

In literature, few such cases have already been reported by Agrawal, Rasool, Arora etc [2-9]. All these cases have reported unrecognized foreign body in form of rubber band or thread as focus osteomyelitis of the distal radius and ulna. The x rays showed in these reports revealed the same typical signature pattern osteomyelitis i.e. lesion at the outer surfaces of the bones, but even after such patterned lesion these cases were initially treated by just antibiotics for the prolonged duration of time. This prolonged treatment just by antibiotics has caused delay and loss of precious time leading to increase in the lesion. This delay in exploration can cause

serious injuries to tendon, nerves or vessels. Since our patient also presented to us late i.e. after 6 months, losing the precious time in conservative treatment by local doctor, she sustained tendon injuries, but was fortunate enough not having any vascular or neural injury. We on viewing such typical patterned lesion on x-rays suspected it to be due to some circumferential foreign body and hence explored immediately and were successful in treating her fully without recurrence.

Hence we recommend, if such specific pattern of osteomyelitis is seen on the x rays, then we should suspect the osteomyelitis caused by foreign body of circumferential nature and should explore immediately to remove the foreign body.

Conclusion

In such specific type of lesions, the history may be inconclusive as it may be forgotten by the child and his parents and the clinical signs can be minimal. MRI and CT scan, although are useful tools in localizing foreign bodies, but are not routinely done. Thus on viewing such typical signature pattern lesion surgical debridement and removal of the foreign body which is the key to successful treatment, should be done promptly.

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Scurvy: An Important Differential Diagnosis Of Sepsis In Young Children

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Abstract

Background: Scurvy a disease, particularly in people with peculiar dietary habits, is cause by Vitamin C deficiency, which is required for collagen synthesis. Impaired collagen synthesis affects skin, cartilage, dentine, osteoid and capillary blood vessels. We present a case of a three year old child having scurvy who presented like sepsis with aim to create awareness among the clinicians about the disease.

Case report: 3 year old female child presented to us with pseudoparalysis, which was misdiagnosed and mistreated as bilateral thigh sepsis for which surgery was also attempted. Radiographs and MRI of the child showed widening of epiphysis, sclerosis of epiphyseal rim, osteopenia and subperiosteal hemorrhages respectively, confirming diagnosis of Scurvy. She was healed fully on Vitamin C supplementation in therapeutic doses.

Conclusion: Malnutrition is rampant in young children in our country and hence nutritional scurvy should be kept in mind as a differential diagnosis of sepsis. This case report also tries to create awareness among the clinicians about the disease and ways to prevent Vitamin C deficiency.

Keywords: Scurvy, Vitamin C Deficiency, Children

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Introduction

Scurvy (Barlow's disease, Moeller's disease, Cheadle's disease) is a disease resulting from deficiency of Vitamin C (Ascorbic acid) which is required for collagen synthesis in humans [1]. This disease, described as early as in 480 – 360 B.C. by Hippocrates and an important cause of deaths on long sea voyages, is common in sailors and people who remain on ships for long time. It may also be seen in people with prolonged peculiar dietary habits, who don't have access to perishable fruits [2]. Treatment is by consuming fresh citrus fruits [3,4]. Most animals are able to synthesis their own vitamin C and hence Scurvy does not occur in animals, but humans and a few other species lack an enzyme necessary for such synthesis, and hence rely on dietary vitamin C [5,6]. In modern scenario, malnutrition is the most common cause of scurvy in children.

Vitamin C is essential for collagen synthesis, and hence typical pathologic manifestations of vitamin C deficiency are noted due to impaired collagen synthesis seen in collagen-containing tissues and organs such as skin, cartilage, dentine, osteoid, and capillary blood vessels. Pathologic changes are a function of the rate of growth of the affected tissues; hence, the bone changes are often observed only in infants during periods of rapid bone growth [6]. We present this case report of a three year old child having scurvy who presented like sepsis with aim to create awareness among the clinicians about the disease and ways to prevent Vitamin C deficiency.

Case Report

A 3 year old female child was referred to our center with parents complaining of swelling thighs and knees, restricted lower limb movements, nonspecific history of fever and excess crying on any attempt to move the child for past 10 days. The child was initially treated elsewhere with a diagnosis of malnutrition and multifocal sepsis and had received multiple antibiotics without relief. An ultrasonography of thigh showed collection both thighs and knees more on right side. The blood counts, ESR and CRP values were normal. There was also history of an incision and drainage done of right thigh, considering it to be an abscess, but notes mentioned that there was no pus.

On our examination, the child was still in acute agony, reluctant to move both the lower limbs. A wound of previous incision and drainage operation was present over right thigh without any pus. Repeat blood counts and ultrasound abdomen were normal. Radiographs of thighs with knee showed some widening of epiphysis with sclerosis of epiphyseal rim and a generalized osteopenia (Fig 1a). An MRI scan was done which showed subperiosteal hemorrhages in both thighs and legs without any bone erosion (Fig 1b & c).

Fig 1. X ray of pelvis c both thigh AP view (a) and MRI view (b & c) showing subperiosteal haemorrhages

Generalized signal alterations were seen in marrow suggestive of edema and increased cellularity with widening and sclerosis of metaphysis. Minor gum bleeding with poor dental health was observed. A diagnosis of Scurvy was made and the patient was put on Vitamin C supplementation in therapeutic doses. After 1 week of therapy, there was gross improvement in symptoms. At 3 weeks the child appeared near normal, voluntarily moving all four limbs with significant reduction in pain on movement. The x rays done at this time showed calcification of the subperiosteal hematomas. At 8 months follow up the child was able to walk without support albeit with some limp. X rays done at this time showed ossified subperiosteal hematomas (Fig 2).

Fig 3. Follow-up X ray at 6week (a) and at 8 months (b) showing healing

Discussion

International incidence of scurvy is unknown. Only few series with very little number of cases are published [7-15]. Ratanchu from Thailand reviewed 28 cases of scurvy in children over a 7-year period (1995-2002) and noted prolonged consumption of heated milk and inadequate intake of vegetables and fruits as the risk factors for the development of scurvy [7]. Epidemic scurvy has been reported among refugee populations with incidence of 5% in women and 12% of men, and in those older than 65 years, this proportion increased to 15% of women and 20% of men [8]. Data from the Third National Health and Nutrition Examination Survey (NHANES III) that assessed the prevalence of vitamin C deficiency in the United States among a sample of 15,769 children and adults (12-74 y) found that 14% of males and 10% of females were vitamin C deficient [9].

Scurvy can occur at any age. Most cases of Scurvy occur when the child is aged between 6 to 24 months. Clinical manifestations develop after an infant has lacked Vitamin C for 6 -10 months. Hence, Scurvy is uncommon in neonates as human breast milk contains

sufficient Vitamin C, provided the mother has adequate intake. Vitamin C is destroyed by the process of pasteurization, so babies fed with ordinary bottled milk sometimes suffer from Scurvy if they are not provided with adequate Vitamin C supplements. Virtually all commercially available baby formulas contain added Vitamin C for this reason, but heat and storage destroy Vitamin C [10].

Vitamin C deficiency leads to defective collagen synthesis resulting in defective dentine formation, gum bleeding, and loss of teeth. Hemorrhaging is a hallmark feature of Scurvy and can occur in any organ. Hair follicles are one of the common sites of cutaneous bleeding. There are reports of a purpuric rash on trunk and legs which responded to Vitamin C supplementation [11]. Hemorrhages of the gums usually involve the tissue around the upper incisors, which have a bluish-purple hue and spongy feel. Gum hemorrhage occurs only if teeth have erupted. Petechial hemorrhage of the skin and mucous membranes can occur. Rarely, hematuria, hematochezia, and malena are noted. Proptosis of the eyeball secondary to orbital hemorrhage can occur. Besides being essential for collagen synthesis, ascorbic acid is important for biosynthesis of carnitine and neurotransmitters and in hematopoiesis by promoting iron absorption. Risk factors for development of scurvy include male, having a low dietary intake of vitamin C, not taking vitamin supplements, and smoking [12].

Initial symptoms of a child with scurvy are nonspecific and include loss of appetite, peevishness (ill-tempered), poor weight gain, diarrhea, tachypnoea, fever. Specific symptoms include irritability, pain and tenderness of the legs, pseudoparalysis, swelling over the long bones and hemorrhage. Infections in childhood can also present in a similar manner, like in our case due to which the child was misdiagnosed and mistreated in lines of sepsis.
On physical examination the infant is apprehensive, anxious, and progressively irritable. The child may have low grade fever, anaemia and poor wound healing. Severe tenderness over the thighs is noted during change of diapers. The excruciating pain results in pseudoparalysis and the child assumes frog leg posture (i.e. keeping hips and knees slightly flexed and externally rotated) for comfort.

Costochondral beading or scorbutic rosary is a common finding. The scorbutic rosary is distinguished from rickety rosary (which is knobby and nodular) by being more angular and having a step-off at the costochondral junction. The sternum is typically depressed.
Although, hyperkeratosis, corkscrew hair, and sicca syndrome are typically features of adult scurvy and are rarely seen in infantile scurvy, Mc Kenna reported an infant with these features of adult scurvy showing diffuse, nonscarring scalp alopecia with radiologic features of scurvy was reported in 2008 [13].

Bony involvement is typical for infantile scurvy, which occurs at the junction of the diaphysis end and the growth cartilage. Osteoblasts fail to form osteoid (bone matrix), resulting in cessation of endochondral bone formation, but normal calcification of the growth cartilage continues, leading to thickening of the growth plate. The typical invasion of the growth cartilage by the capillaries does not occur. Preexisting bone becomes brittle and undergoes resorption at a normal rate, resulting in microscopic fractures of the spicules between the shaft and calcified cartilage. With these fractures, the periosteum becomes loosened, resulting in the classic subperiosteal hemorrhage at the ends of the long bones. Intra-articular hemorrhage is rare because the periosteal attachment to the growth plate is very firm [14]. Subperiosteal hemorrhage is a typical finding of infantile scurvy, which is often palpable and tender in the acute phase causing excruciating pain and is seen at lower ends of the femur and tibia which are the most frequently involved sites.

Plasma ascorbic acid level may help in establishing the diagnosis, but the best confirmation of the diagnosis remains its resolution following vitamin C administration. Plasma ascorbic acid level tends to reflect the recent dietary intake rather than the actual tissue levels of vitamin C. Signs of scurvy can

occur with low-normal serum levels of vitamin C. Fasting serum ascorbic acid level greater than 0.6 mg/dl rules out scurvy. Serum ascorbic acid levels of less than 0.2 mg/dl are deficient and Scurvy occurs at levels less than 0.1 mg/dl.

The earliest radiologic manifestations are seen at growth cartilage-shaft junction of bones with rapid growth like distal ends of radius or femur, where fuzziness of the lateral aspects of the cortices is present with slight rarefaction of the neighboring cancellous bone. As the disease progresses, the cortex becomes thin and the trabecular structure of the medulla atrophies and develops a ground-glass appearance. The zone of provisional calcification becomes dense and widened, and this zone is referred to as the white line of Fränkel. The epiphysis also shows cortical thinning and the ground-glass appearance. Key imaging features show osteoporosis. Metaphyseal spurs or marginal fractures (Pelkan spur), a transverse band of radiolucency in the metaphysis (scurvy line or Trümmerfeld zone), which is subjacent to the zone of provisional calcification; ring of increased density surrounding the epiphysis (Wimberger ring); and periosteal elevation can also be noted. As scurvy becomes advanced, a zone of rarefaction occurs at the metaphysis under the white line. The zone of rarefaction typically involves the lateral aspects of the white line, resulting in triangular defects called the corner sign of Park. This area has multiple microscopic fractures and may collapse with impaction of the calcified cartilage onto the shaft. The lateral aspect of the calcified cartilage can project as a spur. Subperiosteal hemorrhages are not visualized in the active phase. With healing, they become calcified and are readily observed.

Sudden death due to cardiac failure is reported in infants and adults with scurvy. Predominant morbidity is a result of hemorrhage into various tissues. Recent laboratory data suggest that the neonatal brain is particularly susceptible to vitamin C deficiency and that this condition may adversely affect early brain development [15]. Treatment is to prescribe Vitamin C supplementation in therapeutic doses as per age which ranges from 40 mg to 90 mg per day. Prevention is by taking a balance diet with enough Vitamin C.

Conclusion

This case report highlights the fact that in our country where malnutrition is rampant in young children, nutritional scurvy should be kept in mind as a differential diagnosis of sepsis. We also try to create awareness among the clinicians about the disease and ways to prevent Vitamin C deficiency.

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Prof. HKT Raza (1956-2019)

Prof. Dr Haroon Khizir Taqi Raza, an internationally renowned Orthopaedic surgeon is not with us physically due to his sudden demise on 14th March, 2019 but he will always be remembered as a dynamic extraordinary academic leader in the Orthopaedic world nationally and internationally. After his under graduation (1978) and post-graduation (1982), he worked as a faculty in the Department of Orthopaedics at GRMC Medical College, Gwalior and at NSCB Medical College, Jabalpur. He headed the Department of Orthopaedics, NSCB Medical College for almost more than 20 years. In the department, he was always involved in undergraduate and postgraduate teaching. With his special interest in spinal surgery, he was the man behind the establishment of Regional Spinal Injury Center at Jabalpur and with his efforts more than 100 posts were created in that center. He was involved in the development of sub-specialties in the department. He taught many not only the academics but the high values of life like full dedication to work, sincerity and organizational skill. He was the founder Dean of Chindwara Institute of Medical Science. He took the Jabalpur, Madhya Pradesh to such a height that Jabalpur became the synonymous with name of Dr Taqi Raza among the orthopaedic fraternity worldwide. His original research work on trabecular pattern in the femoral head, designing cobrahood plate for subtrochanteric fracture, hockey stick plate for supracondylar femur and muscle pedicle graft for chronic osteomyelitis was well appreciated in the scientific meetings all over. He was the editor of Journal of Orthopaedics, MP Chapter for 6 years. With his efforts, for the first time national conference of Indian Orthopaedic association (IOACON) in 1998 was held in the Jabalpur which made the history in the excellence of hospitality in spite of meager infrastructure to cater more than 5000 persons at that time. It was due his public goodwill and face-value that for the first time public supported wholeheartedly to make national conference a grand success and Jabalpur stood the first for that. Jabalpur is still remembered for the hospitality, academics and interaction between members of Indian Orthopaedic Association for IOACON 1998. After grand success of conference, he contested and became the Honorary Secretary of IOA and remained for two terms. During his tenure, emphasis on postgraduate teaching, affiliation of state chapters to IOA and publication of newsletter was given. During this period, he was also the man behind the formation of the blue book of Indian Orthopaedic Association. Further he became the youngest President of IOA in 2006 and he gave the theme of his presidency "Focus on Golden Hour" for trauma victims and organized the awareness programs nationwide with free distribution of CD on first Aid. He started IOA-AOA exchange fellowship with Australian Orthopaedic Association and IOS-UK with British Orthopaedic Association to facilitate international exposure for the members of Indian Orthopaedic Association. He started the social Orthopaedic society of

India and he started Teachers training program first time. He had setup 100 bedded temporary hospital to help the earthquake victim of Bhuj Gujarat and Indian Orthoapedic association send him to Nepal during Earthquake in Kathmandu. He had made more than 170 publications and scientific deliberations to his credit and got several fellowships and awards including the prestigious A. A. Mehta Gold medal, J & J fellowship and the most prestigious award of IOA – Dr. B. N. Sinha award. He had organized the Asia Pacific Orthopaedic Association (APOA) congress 2012 at New Delhi and also became the First Indian President of APOA, taking his glory to the international level. On the eve of Doctors day, Government of Madhya Pradesh honored him with appreciation letter remembering his works towards the upliftment of medical Education.

Sudden demise of Prof Raza is an irreparable loss, which have filled the hearts of not only the Orpaedians worldwide but for the whole of the society with deep sorrow and sadness. He shall be always remembered in our hearts.

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