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All submitted articles will first be screened by the Editorial Board to see if the articles confirm to the standard and style of the journal as per the manuscript submission criteria. The article is then sent to a member of the Peer Review Committee for scrutinising and feedback before being accepted for publication.

EDITORIAL NOTE

Dear Readers,

Manipal Alumni Association of Malaysia has been in existence since 1979. Started as a social group, it has now gone into different facets essential to fellowship and professional development. Manipal Alumni Science & Health Journal (MASH) is an online access publication of Manipal Alumni Association Malaysia. It was launched in 2014 at the First Global Manipal Alumni Health & Sciences Conference by the then Minister of Health, Malaysia. We have published 2 volumes and this is our 3rd volume. This year we have succeeded in obtaining our ISSN number making the journal an official scientific publication. The number as provided by the National Library of Malaysia is 2500-3977.

MASH focuses on editorial, original research work, opinion papers, case reports, update/review articles belonging to different disciplines of medicine, health and science. The Journal is available online and access is free of cost to all Members and Associate Members of the Manipal Alumni Association of Malaysia (MAAM). The Journal can be accessed for a fee by non-Manipal Alumni members or associate members.

The objectives of the journal are to provide a forum to the medical and science fraternity from students to Consultants belonging to varying disciplines to project their original work/interesting case material and share their experience. This journal adopts a multidisciplinary approach and will lead to a wider scope of cover and hopefully a wider circulation. This is a peer-reviewed journal so all submissions are carefully scrutinized before publication.

This year apart from finally having our ISSN number, it has been announced that all healthcare professionals require adequate CME points for practice license renewal. Research is an important component of continuing medical and professional education and it is heartening to know that the Malaysian Medical Council – Continuing Professional Development MMC-CPD Grading System Scoring Schedule includes publications of original articles in journal. The points for non-indexed journals are 10 per author per article. This should be a real incentive to publish and the MASH is happy to provide an additional platform for this to happen.

This 3rd edition of the MASH has a variety of articles and for the first time a contribution from the field of biotechnology. There is also an opinion paper in Orthopaedics and finally two case reports. All these articles were reviewed by experts in the respective fields and we have tried to maintain the authenticity and validity of the work. A big thank you to our Reviewers and look forward to calling on your help and support again.

Thank you to the new members of the Editorial Board and look forward to working with all of you in trying to eventually make the MASH indexed. I do hope that more Researchers, Clinicians, Students and Scientists will consider sending their articles to the Manipal Alumni Science & Health Journal

We hope you enjoy this 3rd Volume and best wishes to everyone for the rest of 2018 from all of us in the Editorial team.

Professor Dr. Philip George

Editor, on behalf of the MASH Journal Editorial Board

CASE REPORT

Biopsychosocial Approach To Managing Pathological Gambling – A Case Report

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Key Words: *pathological gambling, psychological therapies, naltrexone*

Abstract

Introduction

Pathological Gambling is slowly becoming a common condition of concern in our communities. With the accessibility of online gambling sites, the problem is fast affecting differing age and ethnic groups in Malaysia. Understanding it as an addiction and addressing and managing it in primary care is essential to help prevent the social, financial and psychological effects it brings.

Case Description

We report the presentation of a patient with Pathological Gambling and the treatment using a biopsychosocial approach. This approach has yielded a positive outcome.

Conclusions

There are effective treatment strategies for Pathological Gambling which incorporate a holistic intervention and approach.

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Introduction

Gambling addiction is the vernacular term for the ICD-10 diagnosis, “Pathological gambling” (F63.0). It is a behavioural addiction and in ICD-10 remains under the rubric of Habit Impulse Control Disorder. The main characteristic is frequent and repeated episodes of gambling, that dominate the patient’s life to the detriment of social, occupational, material, and family values and commitments¹. Gambling behaviour stimulates the brain reward and feedback system similar to substance abuse². Furthermore, gambling disorder symptoms of dependence, craving, tolerance and withdrawal with high rates of relapse are comparable with substance use disorders.

Case Summary

A 42-year-old man who is currently in between jobs and in a relationship presented in March, 2017 with a history of uncontrollable gambling. His first episode started 8 years ago when he continuously frequented gambling dens and played the slot machines. He racked up a huge debt and later due to serious financial losses was able to stop on his own and build his financial status again.

Three years later was his second episode. He frequented the slot machines again and this time his debts were even higher. He had multiple loans and also borrowed money from a money lender for his gambling. He admitted that this affected his relationship with his partner and his family. His family had to bail him out as the money lender was threatening him and the family. He then felt remorse and went to see a mental health professional for help. He was started on an antidepressant as he presented in the aftermath of being detected with a gambling addiction with symptoms suggestive of depression. The antidepressant did not stop his urges or craving for gambling.

His third episode started 4 months prior to his presentation. He resumed the slot machines and spent more and more time and lost more money over the period. He decided to seek help again when his family were approached and threatened by money lenders once again. He is currently paying a total debt of \$200 000 which was mostly paid for by his family and personal loans. He has no personal assets, as all his money has been spent on gambling.

He is currently on Naltrexone 50mg at night which is helping to keep his cravings and desire for gambling to a minimum. He was made to do a balance sheet exploring the good and bad of his habit and then with the Therapist explored the common triggers for his gambling including stress, reward, over confidence, boredom, place and time. A set of alternatives and diversions were discussed and a schedule was created to make him occupied so that he has no time to entertain his cravings. He was referred to Gamblers Anonymous (GA) which is a self-help group recently set-up in Kuala Lumpur. Although suffering from a relapsing serious habit and disorder, he is now confident that with the current therapies he may not relapse again.

Discussion

The ease of accessibility of online casinos via smartphones and tablet applications have increased the access to gambling venues ³. In Malaysia 4.4% of the general population were categorized as problem gamblers while 10.2% were moderate risk gamblers ⁴.

People affected by gambling problems tend to keep this hidden due to stigma and shame. Screening in patients who are deemed high risk, such as those presenting with psychosomatic symptoms, other psychiatric disorders including substance misuse, depression, and anxiety-spectrum disorders, and those reporting financial problems can be done by a GP ⁵. Brief screening questionnaires like the [NODS-CLiP](#), can be used in primary healthcare for screening patients.⁶

Psychotherapy and pharmacological therapy are currently used to treat pathological gamblers. Studies have proven that opioid antagonists like Naltrexone ⁷ reduces the severity of the symptoms associated with pathological gambling and therefore can be considered as a first line treatment for pathological gambling⁸. Naltrexone is an Opioid antagonist which decreases dopamine neurotransmission in the nucleus accumbens and the reward pathway, thus reducing gambling-related excitement and cravings. As the serotonin system is implicated in impulse control problems, Selective Serotonin Reuptake Inhibitors (SSRI's) have also been tried in Pathological Gambling. However, data from double-blind randomized pharmacotherapy trials of SSRI's have been inconclusive⁹. In a study of 40 pathological gamblers with bipolar spectrum disorders, Lithium Carbonate (mean lithium level: 0.87 meq/L) was shown to be superior to placebo in reducing gambling symptoms during 10 weeks of treatment¹⁰.

Several types of psychotherapy are also currently used to treat pathological gamblers. Typically, Cognitive Behaviour therapy and Brief and Motivational Interviewing are essential psychological therapies for Pathological Gambling. Gamblers Anonymous is a group therapy that provides peer support and structure. The meetings follow the 12-step self-help model which are identical to those utilized for substance abuse, except that gambling replaces alcohol or drugs¹¹. It also supports those in treatment through a buddy system.

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CASE REPORT

Right Axillary Schwannoma Mimicking And Axillary Lymphadenopathy

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Key words: *Schwannoma, nerve sheath tumor, brachial plexus, axilla*

Introduction

The most common palpable axillary masses are lymph node metastases from breast cancer. However, the axilla is an area which contains various mesenchymal tissues such as fat, vessel and nerve where other pathology can arise. We present to you a case of a brachial plexus tumour presenting as an enlarged axillary mass. We hope to highlight the characteristic imaging findings of brachial plexus tumour to assist in the correct diagnosis of axillary masses.

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Presentation

A 60-year-old lady presented with complaint of painless right breast swelling for past two years, progressively increasing in size. She had weakness and numbness over her right upper limb. She was not able to clench her fist or carry weights in her hand in the preceding six months. The weakness initially improved with acupuncture, but later worsened thus prompting the referral to surgical department.

Clinical examination revealed a 4x4 cm, ill defined, firm, immobile and non-tender mass at the right axillary tail. Ultrasound and mammogram showed a large, oval, predominantly hypoechoic mass at the right axillary tail. The margins were well defined except at its medial border where it was ill defined. This lesion showed posterior enhancement except at its ill-defined medial border. No calcification or increase in vascularity detected. There was no other focal lesion in the left breast or in the axilla and no other enlarged axillary nodes. Mammogram was unremarkable. A diagnosis of suspicious lesion (BIRADS 4) at the right axillary tail was made and ultrasound guided core biopsy performed.

CT thorax done showed a well-defined, enhancing soft tissue mass at the right axilla representing a benign soft tissue tumour in which differential included neuroma.

MR of the right axilla showed a well-defined, enhancing T1WI isointense lesion which was heterogenous on T2WI. The axillary nerve was identified separate from the lesion at the proximal aspect of the mass but was indistinguishable as it reached the epicentre of the mass (Figure 1 to 2). The lesion was eccentrically located in relation to the axillary nerve.

HPE of the core biopsy revealed a nerve sheath tumour favouring schwannoma. Patient underwent an excisional biopsy of the lesion. Intraoperatively, it was a soft, well encapsulated tumour which was not adherent to any major neurovascular structures measuring 13 x 3.5cm and weighing 99grams. HPE of the excisional biopsy corresponded to the earlier HPE results of schwannoma. Patient recovered well with no residual neurology on her right upper limb.

Discussion

Brachial plexus tumour is rare comprising of only 5% of all tumours of the upper limb. The two most common benign brachial plexus tumour are neurofibroma and schwannoma each with an incidence of about 5% of all benign axillary soft tissue tumours. The most common site of extracranial schwannoma is in the head & neck while a location in the axilla is unusual [1]

The differential diagnosis of a solid axillary mass is wide which includes benign and malignant masses arising within the accessory axillary breast tissue, metastatic lymph nodes, extra-abdominal desmoid tumour, nerve sheath tumours, malignant fibrous histiocytomas, haemangiomas, lipomas and old hematomas [2]. In view of her risk factor (nulliparity, age), a biopsy was performed to exclude breast malignancy.

Pre-operative diagnosis of a nerve sheath tumour for surgical planning is ideal whenever possible. Pre-operative biopsy should be avoided as it may result in peritumoral scar formation, obscuring the normal brachial plexus anatomy rendering the subsequent resection more difficult. Several radiological features are valuable in distinguishing schwannomas from other entities.

Sonographically, schwannoma is usually a well-defined oval homogenous hypoechoic mass with or without posterior enhancement [3]. Target sign which consists of a hyperechoic centre with a hypoechoic periphery may be seen [4]. The peripheral hypoechogenicity is due to the presence of myxoid tissue while the hyperechoic centre is due to the collagen deposits [5]. A hyperechoic “ring sign” is said to be a rare but pathognomonic feature of nerve sheath tumours [3]. Cystic spaces are also common indicating the degenerated portion of the mass. An echogenic capsule may be seen. Ultrasound may also demonstrate the presence of neurovascular bundle within the mass [6]. In our patient, target sign is demonstrated.

Another point of interest is that schwannoma tends to be painful during percutaneous biopsy. Thus presence of radiating and shooting pain during biopsy should alert the operator of the possible diagnosis of a schwannoma[7]. This was not recorded for our patient.

MR brachial plexus is the imaging of choice for assessment of brachial plexus lesion. 75% of nerve root tumours will have signal intensity similar to the spinal cord on T1W imaging and 95% will have very high signal intensity on T2W imaging [8]. Following contrast administration, nearly all nerve sheath tumours enhance. The findings of non-homogenous contrast enhancement is frequently seen in cases of schwannoma[9] as is seen in our case.

There are few distinctive MR features that will suggest a diagnosis of peripheral nerve sheath tumours. These include target sign, fascicular sign, and split fat sign. Target appearance which consists of T1WI hyperintense rim and hypointense center is often seen.

This finding corresponds to the pathologic findings of central fibrous components and peripheral myxomatous elements [9]. Fascicular sign describes the fascicular appearance which are speckled central areas of hypointense foci seen within neurogenic tumours, possibly reflecting the fascicular bundle seen histologically [9]. In our patient, both the target and fascicular sign are depicted.

Schwannoma and neurofibroma are often indistinguishable in MR as both are isointense to muscle on T1W and hyperintense on T2W with variable degree of enhancement and both may display the target sign. The position of the tumour in relation to the parent nerve is helpful in differentiating these two entities. In schwannoma, the tumour is usually eccentrically located, while in neurofibroma, the nerve is usually centrally located [9]. In a case report series, it is found that an eccentric position of the mass to the nerve is suggestive of a schwannoma, but if the tumour was centrally located in relation to the neural elements, these two entities could not be distinguished [10]. In this patient, the tumour is eccentrically located in relation to the parent nerve, making the diagnosis of schwannoma more likely.

In summary, several sonographic and MR features including target sign, fascicular sign and its relationship with the peripheral nerve may aid in the diagnosis of a nerve sheath tumour. However HPE is still the gold standard for diagnosis.

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Images



Figure 1: Heterogenously hyperintense lesion which is abutting onto the right axillary artery in this T2 coronal sequence.



Figure 2: T1WI axial imaging showing the homogeneously hypointense mass separate from the axillary nerve at its superior aspect.

ORIGINAL PAPER

Ceiba Pentandra (Kapok), Mangifera Indica (Mango) And Carica Papaya (Papaya); A Possible Source Of Biodiesel

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Keywords: Biodiesel, *Ceiba pentandra*, *Carica papaya*, *Mangifera Indica*, Acid catalyzed transesterification, Gas Chromatography-Mass Spectrophotometry (GC-MS)

Abstract:

The search for non-edible seed oil as the second generation of biodiesel feedstock has led to the focus of this research. The objective of this research is to highlight the potential of the local agricultural waste as potential biodiesel feedstock. Hence, the oil from locally available *Ceiba pentandra* (Kapok), *Carica papaya* (Papaya) and *Mangifera indica* (Mango) seeds were extracted to synthesize biodiesel and investigate its properties. The seeds were obtained locally, dried and extracted with n-Hexane. In this research, acid catalyzed transesterification was carried out with 1% HCl and a butanol to oil ratio of 30:1. The free fatty acid percentage, acid value, iodine value, density and heat of combustion of the synthesized biodiesel were analyzed and found to meet the European diesel fuel specification, EN 14214, except for Mango biodiesel's density which was lower than the required value. Papaya had an acid value of 0.30 mg KOH/g, iodine value of 0.6 g/100g, density of 0.87 g/cm³ and heat capacity of 2382.6J/g. Mango (Chokanan variety) biodiesel had an acid value of 0.30 mg KOH/g, iodine value of 18.0g/100g, density of 0.80 g/cm³ and heat capacity of 2090.0J/g. Kapok biodiesel had an acid value of 0.25 mg KOH/g, iodine value of 45.4 g/100g, density of 0.86 g/cm³ and heat capacity of 1964.6 J/g. GC-MS demonstrated that the major fatty acids detected in the biodiesel samples were saturated fatty acids; Palmitic acid, Stearic acid and Myristic acid. Hence, the results of this study show that these local agricultural waste have good potential as biodiesel feedstock and should be further investigated to harness their economic potential.

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1.0 Introduction

Currently, there is a global outreach for sustainable energy sources due to the inadequacy of petroleum based fuels to meet the increasing demands of the energy crisis. The availability of sulphur in petroleum based diesel that causes corrosion of engine parts and environmental pollution is another contributing factor. On the other hand, using raw vegetable oils in diesel engines can cause a variety of engine-related problems ranging from poor fuel atomization to engine deposits and piston ring sticking (Asokan and Vijayan, 2014). Thus, transesterification has been found to be effective in reducing the viscosity of vegetable oils aiding the production of biodiesel. A biofuel is an alternative fuel that is designed to mimic the properties and performance of petroleum diesel. It is a fuel composed of monoalkyl esters of long chain fatty acids derived from triglycerides of vegetable oils and animal fat. Biodiesel can be used in compression-ignition (diesel) engines (Knothe *et al.*, 2005) and has better properties than petroleum diesel such as biodegradable, safe to use (non-toxic), ecofriendly and free from sulfur and aromatics. Currently, biodiesel provides around 3% of the world's total transport fuel on an energy basis (Azad *et al.*, 2015).

First generation biofuel feedstock were derived from edible oil seed crops such as sunflower, palm, rapeseed, soybean, coconut and many more. However, their production is not sustainable because of its perceived competition with food which brings up the price of edible oils.

In this study, seeds of *Ceiba pentandra* (kapok), *Mangifera indica* (mango) and *Carica papaya* (papaya) found in Malaysia were chosen. Mango and papaya are sought after for their delicious fruits and fiber from kapok is used in pillows, upholstery, soft toys and mattresses amongst others (Anigo *et al.*, 2013). However, the seeds of these chosen plants were discarded as waste because they are not consumed by human.

The study focuses on synthesizing and characterizing the biodiesel produced from *Ceiba pentandra* (Kapok) seed oil, *Mangifera indica* (Mango) seed oil and *Carica papaya* (Papaya) seed oil as new alternative fuels for petroleum diesel relative to other biodiesel and standard fuels.

2.0 Materials and Methods

2.1 Sample collection and Extraction

Kapok fruits were collected from Kapok trees growing wild in the forest of Perak, Malaysia. Mangoes and papaya were bought from Nilai. The seeds were removed and dried in an oven at 60 °C to remove moisture content. Dried seeds were finely crushed using a mortar and pestle. 20 g of the dried and crushed seeds were extracted by Soxhlet extraction method at 60° C with 250mL of n- hexane for 6 hours. The oil was recovered by evaporating the solvent.

2.2 Determination of % Free Fatty Acid

Acid value of the extracted oil was determined using 0.1M KOH using phenolphthalein as an indicator, as described by Folaranmi, 2013.

2.3 Transesterification

Preparation of biodiesel from the oils was done by transesterification. In the present study, transesterification was achieved by using HCl as the catalyst. Butanol in the presence of HCL was used to brake the molecules of raw oil into ester and glycerol. The mixture was maintained at 117°C for 3 hours (Pathak, 2015). The mixtures were allowed to settle for 24 hours in a separating funnel. Lower layer of the oil was obtained by evaporation of solvent.

2.4 Properties of Transesterified Kapok, Mango and Papaya Seed Oil

Properties of the fuel such as acid value, iodine value and density was determined and the result was compared with EN 14214 standard.

2.4.1 Thin Layer Chromatography (TLC)

TLC test was carried out with the crude oil samples and the biodiesel samples. This test was done to view the presence of phospholipids and triglycerides which were present in the oil. Chloroform: methanol: water (7:3:1) and cyclohexane: ethyl acetate (3:2) was employed as a mobile phase. The oil samples were tested by spotting it onto the TLC paper. Before the compounds touched the solvent front, iodine crystals were dropped into the TLC chamber. This was to observe the presence of double bonds.

2.4.2 Gas Chromatography-Mass Spectrophotometer Analysis

Biodiesel components and fatty acids present in the sample were analysed using Gas Chromatography-Mass Spectrophotometry (GC-MS) from Agilent Technologies.

3.0 RESULTS AND DISCUSSION

3.1 Properties of transesterified biodiesel

Sample	Papaya Biodiesel	Mango Biodiesel	Kapok Biodiesel	EN 14214
Oil Yield (%)	32.1	22.9	17.2	-
Biodiesel Yield (%)	40.5	41.3	50.0	-
Density (g/cm ³)	0.87	0.80	0.86	0.86-0.90
Acid Value (mg KOH/g)	0.3	0.3	0.25	<0.5
Iodine Value (g/100g)	0.6	18.0	45.4	<120.0
Heat capacity (J/g)	2382.6	2090.0	1964.6	-

Table 3.1: Properties of Biodiesel obtained

From the test results, acid value of kapok, mango and papaya oil biodiesel comply with the standard range required. Both the papaya and mango biodiesel's acid value was 0.30 mg KOH/g followed by kapok, 0.25 mg KOH/g. Similar results were shown by Charvet *et al.* (2011) and Kittipom and Sutasinee (2013) for the acid values of papaya and mangoes. Acid value measures the free fatty acids content, helps to state the corrosive nature of the fuel, its filter clogging tendency and amount of water that may be likely present in the biodiesel. The higher the acid value, the lower the quality of the fuel. Hence, from this research, acid catalysis proved to produce biodiesel with lower acid values.

Kapok had the highest iodine value, 45.4 g/100g compared to mango, 18.03 g/100g and papaya, 0.64g/100g biodiesel. All the three biodiesel samples show good oxidative stability as biodiesel fuel and meeting the acceptance range, <120.0g/100g. However Agunbiade and Adewole (2014), Wong *et al.* (2014) and Charvet *et al.* (2011) have reported higher iodine value for papaya oil biodiesel.

Density is the mass to volume ratio of fuel, measured in kg/m³ and is referred as the energy content per litre of fuel. A lower density oil has a lower peak power. Thus, density is important to assess the ignition quality of the fuel (Asokan and Vijayan, 2014). The density value of kapok oil biodiesel was, 0.86 g/cm³ followed by papaya, 0.87 g/cm³ biodiesel and its lies in the specified range of EN 14214 specification. These results were supported by Wong *et al.* (2014) and Anigo *et al.* (2013). Mango biodiesel does not fall into the EN14214 accepted biodiesel range of 0.86-0.90 g/cm³. On the contrary, Umaru *et al.* (2014) and Momoh *et al.* (2014) reported that mango seed's biodiesel density as 0.88 g/cm³ and 0.87 g/cm³ respectively, falling in the accepted range of biodiesel standard.

Calorific value is another important parameter in this study. It defined as the number of heat evolved by the complete combustion per unit weight of fuel. The biodiesel produced

from the 3 samples were tested for its calorific value. Papaya oil biodiesel released the highest energy, 2382.6 J of heat from 1g of oil followed by mango, 2090.0 J and kapok, 1964.6 J.

3.2. Thin Layer chromatography

TLC results showed the presence of the fatty acid alkyl esters in the samples. Hence, this is a good primary screening technique to check the presence of the desired compounds in the samples.

3.3 GC-MS Analysis

The presence of biodiesel (fatty acid butyl esters) in this work was analysed by GC-MS. The synthesized papaya biodiesel contained a high amount of palmitic acid butyl esters (76%) and stearic acid butyl esters (47%). The major fatty acid detected was saturated fatty acids; palmitic, stearic acid and tetracosanoic acid. Synthesized mango biodiesel contained mainly palmitic acid butyl esters (77%) and stearic acid butyl esters (34%). The major fatty acid detected was saturated fatty acids; palmitic, stearic acid and even B-sitosterol. Synthesized kapok biodiesel contained mainly myristic acid n-butyl ester (71%), palmitic acid butyl esters (68%) and stearic acid butyl esters (39%) in good amounts. The major fatty acid detected was also saturated fatty acids; Myristic acid, palmitic acid and stearic acid. This is different from Wong *et al.* (2014) and Umaru *et al.* (2014) who had reported unsaturated fatty acids as the major fatty acids present in their papaya and mango biodiesels respectively.

Conclusion

As a conclusion, the present study proved that the seed oils of *Ceiba pentandra*, *Mangifera indica* and *Carica papaya* have the potential to be used as feedstock to produce biodiesel using acid transesterification method. The properties of produced biodiesel were analysed and found to have met the biodiesel standard of EN 14214. Besides this, GC-MS detected the main fatty acids present in the chosen seed oils biodiesel was saturated fatty acids (palmitic acid, stearic acid and myristic acid).

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OPINION PAPER

Myths In Orthopaedic Surgery: Debunking Pervasive Dogmatic Beliefs

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Introduction

Good stories attract our attention and are easily remembered even if they are false. However established facts are often forgotten because they do not form easy to remember stories (1).

Good stories often become traditions which are passed from senior experienced surgeons to the junior trainees. Many of these traditions are often not evidence based but are based on observations and concepts which are developed by the seniors through years of practice.

Creating stories that can be passed on for generations is creativity and is by no means bad but we need to do a reality check to see if they are actually correct, logical and reasonable. There are many myths in orthopaedic surgery which have been passed on for generation and busting these myths is not easy and can be unpopular. There are many who still cling on to these myths despite the fact that evidence based medicine has proven some of these myths to be false (1).

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Hip and Knee Arthroplasty

Husted et al (2) have done an excellent review of the traditions and myths associated with hip and knee arthroplasty.

Preoperative Traditions

Studies show that preoperative removal of hair, urine sampling and testing, use of plastic adhesive drapes and preoperative warming of the operation theatre are not necessary and these measures do not improve the outcome of knee and hip arthroplasty. The infection rates with and without shaving are similar. Neither does treating asymptomatic bacteriuria affect the infection rates. The use of adhesive drapes does not reduce the infection rates. On the contrary the infection rates appear to be higher with use of such drapes and the current evidence is clearly against the use of such drapes. Prewarming of operation theatres has been practiced in the past to prevent hypothermia which can increase bleeding, infections and cardiac events but one study showed that the body core temperature did not change when the temperature was 17 or 24 degrees (2).

Intraoperative Traditions

The use of Tranexamic acid is believed to be associated with increased risk of thromboembolic events. However the review of literature shows that there is no evidence of increased risk of thromboembolic events with the use of Tranexamic acid. In fact, it significantly reduces blood loss and the need for transfusion (2).

The use of tourniquet in knee replacement is believed to improve the cementing of prosthesis. However studies show that there is no difference in the fixation of prosthesis with or without the use of tourniquet. The blood loss and the need for transfusion are also similar in both groups. On the other hand early recovery is slower with the use of tourniquet and the incidence of thromboembolic events is higher with the use of tourniquet (2).

The use of disposable skin knife is an old tradition which has no scientific evidence to support its use. Neither is there any evidence for use of routine intraoperative indwelling urinary catheters. The urinary retention rates are 32% with both general anaesthesia and regional anaesthesia. The urinary infection rates are the same with and without the use of indwelling urinary catheters. In the 32% of patients who develop urinary retention intermittent catheterization can be carried out thereby avoiding any catheterization in 8% of the patients (2).

Drains are believed to reduce the incidence of haematoma formation which may require evacuation. However the use of drains have never been found to be of any use in hip and knee replacement and their use increases blood loss and increases the need for blood

transfusion. The use of drains increases the cost of the joint replacement and it is recommended that drains should never be used in hip and knee arthroplasty (2).

Postoperative Traditions

Postoperative recommendations of leaving the dressing untouched for 24 hours, avoidance of non-steroidal anti-inflammatory (NSAIDS) drugs, avoiding flying in the early postoperative period, antibiotic prophylaxis for dental procedures, use of continuous passive motion (CPM), use of cryotherapy, not discharging patient till knee flexion is 90 degrees, and haemoglobin trigger of 10g/dl or a drop of haematocrit of 30% for blood transfusion, though widely practiced, these recommendations have no scientific basis (2).

It appears that surgeons must abandon some of these practices that do not improve patient care but increases cost to the patients. These procedures are commonly carried out and the cost of these procedures is rapidly rising. Hip and knee replacement surgery is one of the most gratifying surgical procedures for the patient since it can tremendously improve the lives of many disabled patients.

On the other hand there are surgical procedures which are frequently carried out by doctors, which do not benefit the patient but exposes the patient to potential risks associated with surgery.

Arthroscopic Joint Debridement For Osteoarthritis And Partial

Meniscectomy (Knee)

Joint Debridement For Osteoarthritis (OA)

When conservative medical treatment for knee pain, in patients with osteoarthritis, fails, surgeons generally advocate arthroscopic debridement of the knee. There has never been any physiological basis for such treatment and why it is done remains an enigma.

In 2002 Moseley et al (3) published an article in the New England Journal of Medicine to show the futility of such treatment but to date such procedures are still carried out, though the numbers have reduced (4). Moseley et al (3) did a randomised, placebo-controlled trial to assess the efficacy of arthroscopic knee surgery to relieve knee pain and improve function in patients with OA of the knee. They had three groups of patients who either had, joint lavage, joint debridement or sham incisions at the arthroscopic portals. Their study showed strong evidence that arthroscopic lavage with or without debridement is no better than placebo in relieving pain and improving self-reported knee function. The authors

concluded that the billions of dollars spent annually on such procedures could be put to better use.

Kirkley et al (5) in 2008 published the outcome of a single-center, randomized, controlled trial of arthroscopic surgery in patients with moderate-to-severe osteoarthritis of the knee. They randomly assigned patients to arthroscopic joint debridement with surgical lavage and physical plus medical therapy or to treatment with physical and medical therapy alone. At 2 years follow up they found that arthroscopic surgery for osteoarthritis of the knee provided no additional benefit as compared to optimized physical and medical therapy.

The American Academy of Orthopaedic Surgeons (AAOS) guidelines for surgical treatment of osteoarthritis of the knee strongly recommend that arthroscopic lavage and/or debridement should not be performed for primary diagnosis of symptomatic osteoarthritis of the knee (6).

Partial Meniscectomy

Arthroscopic partial meniscectomy is the most common orthopaedic operation performed in the USA (7). About 700,000 arthroscopic partial meniscectomies are performed annually in the USA at an estimated cost of 4 billion dollars (8). Sihvonen et al (8) did a multicenter, randomized, double-blind, sham-controlled trial to assess the efficacy of arthroscopic partial meniscectomy in patients who had a degenerative tear of the medial meniscus without knee osteoarthritis. Patients with obvious traumatic onset of symptoms and those with OA were excluded. The study showed that arthroscopic partial meniscectomy was not superior to sham surgery, with regard to pain and functional knee scores assessed during a 12-month follow-up period. The authors concluded that partial meniscectomy for degenerative tears provides no benefit to the patients and that there is no scientific basis for continuing the current practice of doing partial meniscectomy for degenerative tears of the meniscus.

Though there is good clinical evidence that arthroscopic joint debridement for osteoarthritis and partial meniscectomy for degenerative tears of the meniscus does not provide any benefit to the patient, yet these procedures are frequent carried out. Such practice defies logic. The only logical explanation why such mythical practices are not abandoned appears to be financial incentives for the surgeon.

Financial incentives in the medical industry are not only limited to surgical procedures.

Lumbar Spine Imaging And Low Back Pain

When a patient presents to the physician with low back pain, an MRI of the lumbar spine is often the diagnostic test of choice of many physicians (often without any clinical work-up), despite the fact that abnormalities of disc in asymptomatic people is well known. This idolatry of imaging is widespread and often the cause of back pain is attributed to the abnormalities detected by the MRI although the findings may be coincidental. Jansen et al (9) studied the prevalence of MRI abnormalities of lumbar spine in 98 asymptomatic subjects (50 men and 48 women) with an average age of 42.3 years. They found that only 38% of the subjects had a normal disc at all levels and 62% had abnormalities of the disc at one or more levels. Fifty two percent had a disc bulge at least at one level, 27% had a disc protrusion and 1% had a disc extrusion. Thirty eight percent had an abnormality at more than one level. The prevalence of disc bulge increased with age. Schmorl's node was seen in 19%, annular defects in 14% and facet arthropathy in 8% of the subjects.

Boden et al (10) did a prospective study in 67 subjects who never had a history of back pain, sciatica or neurogenic claudication. They found that one-third of the subjects had a substantial abnormality on MRI of the lumbar spine. In subjects who were less than sixty years old, 20 per cent had a herniated disc and one had spinal stenosis. In subjects who were sixty years old or older, 57% had abnormal scans with disc herniation in 36 per cent and spinal stenosis 21 per cent of the subjects. There was degeneration or bulging of a disc at least at one lumbar level in 35 percent of the subjects aged between twenty and thirty-nine years and in all but one of the sixty to eighty-year-old subjects.

Chou et al (11) in an excellent review of imaging for evaluation for low back pain have highlighted the following key points regarding the appropriate use of lumbar imaging.

- 'Strong evidence shows that routine back imaging does not improve patient outcomes, exposes patients to unnecessary harms, and increases costs.
- Diagnostic imaging studies should only be performed in patients who have severe or progressive neurologic deficits or with features suggesting a serious or specific underlying condition.
- Advanced imaging with MRI or CT should be reserved for patients with a suspected serious underlying condition or neurologic deficits or who are candidates for invasive interventions.
- To be effective, efforts to reduce imaging overuse should be multifactorial and address clinician behaviour, patient expectations and education, and financial incentives.
- Radiologists can help reduce imaging overuse by accurately reporting and providing consultative expertise regarding the prevalence and potential clinical significance (or insignificance) of imaging findings' (11).

Studies show that 30 to 40% of patients with acute back pain undergo routine lumbar spinal imaging. About one third of patients with chronic low back pain undergo advanced imaging such as CT scans and MRI imaging (11). There is a lack of studies on the rates of imaging in Malaysia; however anecdotal evidence suggests that the rates are very much higher. This is despite the fact that most guidelines recommend that in the absence of 'red flags' an adequate course of conservative treatment for back pain should be undertaken before imaging the spine.

Routine imaging of the spine does not improve patient outcome and routine imaging of the spine is not cost effective. There is weak correlation between image findings and symptoms. Imaging of the lumbar spine is not without risks. Lumbar x-rays and CT scans contribute to an individual's low-level radiation exposure which could promote carcinogenesis (11). There is an established strong correlation between an increase in lumbar imaging and increased rates of spinal surgery. Financial incentives are known to increase the rates of imaging and spinal surgery (11). It is myth that routine spinal imaging improves patient outcome because there is strong evidence that it does not.

Unnecessary imaging is done not only due financial incentives but also due to an unsubstantiated belief that imaging can be an alternative to a good history and physical examination. This lack of insight permeates many other areas of orthopaedic practice. It is not uncommon to hear from orthopaedic surgeons that osteoarthritis (OA) is a progressive disease and that the patient with OA will, invariably, eventually need reconstructive surgery such as a joint replacement or an arthrodesis of the joint.

Osteoarthritis

Many physicians believe that osteoarthritis (OA) is a progressive degenerative disease of diarthrodial (synovial) joints characterised by pain, limitation of joint movements and eventually deformity of joints. However, there is scientific evidence to show that OA does not progress in all patients. Most of the studies of the natural history of primary OA have been done for OA of the knee and studies for OA of the hip are sparse.

The progression of knee OA is usually slow and it can take many years for the disease to progress. It is also known that it can remain stable for many years (12). In patients with osteophytes alone on radiographic examination, only one third will show radiographic progression (13). Dougados et al (14) in a study of 353 patients with a mean age of 67 years, with a disease duration of 7 years showed that radiographic progression varied between 26.8% to 38.1% and improvement occurred in, between 8.2% and 15.8%, of the individuals.

The study also showed that no significant decrease in joint space occurred over a 1 year period. Obesity and involvement of multiple joints was associated with worsening of joint space narrowing (14). Spector et al (15), in an analysis of 63 patients with a mean age of 60 years and a follow up of 11 years, showed that one third of the knees showed radiographic progression. Thirty-eight per cent of knees with grade 2 (K-L grade) and 16% with grade 3 radiographic changes progressed. Improvement was seen in 10% of the knees. The symptoms did not correlate with radiographic progression (15). Several studies have shown that higher body mass index, older age, presences of Heberden's nodes and diagnosis of generalised OA are associated with progression of radiographic OA (16). Radionuclide bone scan is a sensitive test to distinguish patients in whom the OA will progress from those in whom it will not progress. In patients with negative bone scans the OA apparently does not progress while in patients with positive scans about 60% will progress (17).

Leyland et al (18) in a 14 year population-based cohort study of 1,122 knees found that the percentage of knees with radiographic OA that were replaced (TKR) at year 15 was 1.1% for grade 0 knees, 4.9% for grade 1 knees, 5.3% for grade 2 knees and 6.7% for grade 3 knees. The grade 0 knees at baseline had the highest number of knee replacements at year 15 (10 knees out of 1,122) and grade 3 the lowest number of replacements (2 knees). Hence the majority of individuals (68.4%) who underwent knee replacement did not have radiological evidence of OA at baseline which is suggestive of the fact that radiographs are not the optimal tool for predicting TKR as a long-term outcome in younger individuals (mean age was 53 years at baseline) (18).

Despite so much that has been written and published on the subject, the relationship of radiographic progression of knee OA, to pain, disability and the need for a total knee replacement, remains unanswered.

The natural history of hip OA has been less studied and the course of the disease appears to be more variable. Three clinical studies have reported a wide ranging incidence of clinical deterioration of the disease ranging from 19% to 83% and three radiological studies have reported an incidence of radiological deterioration ranging from 29% to 65% (19).

It is a myth that OA is a progressive disease and that if the patient has OA the patient will invariably develop end stage disease which will require a joint reconstruction.

The situation with post-traumatic OA is not very different although primary OA is a different disease entity where primary multi-joint OA is a risk factor for progression of OA.

Post-traumatic OA

It is not uncommon to hear physicians proclaiming that most patients with intra-articular fractures will develop post-traumatic OA that will progress to end stage disease which will need a joint replacement or a joint fusion. Such beliefs have no scientific basis.

Post-traumatic OA represents about 12% of the global OA burden (20). The risk of OA following significant joint trauma has been reported to range from 20% to 74% (21). Demographics of lower limb arthritis of the hip, knee and ankle in patients presenting to a tertiary orthopaedic centre showed that 54% of ankle arthritis, 12.5% of knee arthritis, and 8% of hip arthritis are post-traumatic in origin (22). However this will not reflect the true prevalence in the population because many patients with post-traumatic OA may not go to hospital for treatment. About 16% of patients with uncomplicated hip dislocation can develop OA and the figure can rise to 88% in some patients having a dislocation with severe complicated acetabular fractures (23). The average time to clinically apparent OA in young adults with history of knee and hip joint injury was 22 years in a cohort of medical students (24). However in severe joint trauma arthritis may be evident within a year.

A commonly held belief by the orthopaedic community that intra-articular fragments must be reduced to within 2 mm of anatomic reduction has not been consistently substantiated by evidence based data. There are multiple studies which show that injuries with substantially greater incongruities are clinically well tolerated (25). Anatomical reduction is not always associated with a perfect clinical outcome and several long term studies have reported good clinical outcome with conservative treatment of intra-articular fracture despite imperfect reduction of the fractures (25). The outcome is often joint specific, for example, fractures of the distal radius with articular gaps and step-offs can have a high incidence OA but the long term clinical outcome can be good (26). In acetabular fractures restoration of superior weight bearing dome is crucial to good radiologic and clinical outcome but involvement of the posterior wall is a negative prognostic factor. In tibial plateau fractures, particularly the lateral plateau injuries, articular incongruity is well tolerated and the degree of incongruity has little effect in determining management outcome (25). However malalignment in the presence of an intra-articular fracture of the proximal tibia is associated with poor outcome. The reason for the tolerance of tibial plateau fractures to incongruity is probably due to greater thickness of the articular cartilage. The clinical outcome of distal femoral incongruity is not known, however, animal studies show that step-offs of greater than the average thickness of articular cartilage cannot remodel successfully while those as large as the full thickness of the articular cartilage can remodel (25).

The incidence of post-traumatic OA following tibial plateau appears to vary from 26 to 31% with about 10% developing moderate to severe OA. The incidence of end stage OA is about 3% in patients who had surgical treatment and 7% in conservatively treated tibial plateau fractures. The functional outcome appears to be good in most patients (27, 28, and 29). About 1% to 7% of the patients with tibial plateau fractures will need a knee replacement (27, 28, 29, and 30).

In patients with ankle fractures the incidence of post-traumatic OA ranges from 1 to 14%. Even in patients with imperfect reduction of the ankle fracture who are treated conservatively, the incidence of moderate post-traumatic OA is about 6% and severe OA is seen in about 1.3% of the patients (31, 32).

Malunion of diaphyseal fractures is often believed to predispose adjacent joints to OA. Studies involving tibial malunions have showed that there is no irrefutable evidence that tibial malunion leads to knee or ankle OA (33, 34).

The incidence of post-traumatic OA of the hip after acetabular fractures ranges from 20% (35) to 38% (36). The number of patients with post-traumatic OA of the hip who will need a hip replacement is not known. Franklin et al studied the natural history of radiographic OA of the hip in a retrospective cohort of individuals. They found that the prevalence of total hip replacement in the patients with radiographic OA of the hip at 11-28 years follow-up was 12% (37).

The incidence of post-traumatic OA of the hip following a posterior dislocation of the hip is between 16% (38) to 25% (39) and the incidence is lower in patients who had their dislocation reduced within 6 hours. The incidence is highest in patients with type IV dislocation (Thompson & Epstein) and lowest in type 1 dislocations.

The incidence of avascular necrosis of the femoral head (AVN) is less than 6% in type I and type II dislocations and reaches 50% in type III and IV dislocations. The incidence is about 4.8% if the reduction is done within 6 hours and goes up to 58% if the reduction is delayed for more than 6 hours (39).

OA is not a progressive disease in all patients and post-traumatic OA does not develop in all patients with joint fractures. In fact the incidence of post-traumatic OA is low and the functional outcome of treatment of intra-articular fractures is good in most patients. The number of patients who require reconstructive procedures such joint replacement or arthrodesis is very low. However this will depend on joint involved and the severity of the injury. It is a myth that OA is always a progressive disease and that all patients with joint injury will develop post-traumatic OA which will eventually need a reconstructive procedure. 10 The lack of adequate and accurate information about the natural history of disease often results in surgeons giving wrong information to the patient and providing the wrong treatment, which, when things go wrong, provides fertile ground for litigation. One of the common areas of litigation for clinical negligence in orthopaedic practice is spinal surgery.

Spinal Fusion For Chronic Low Back Pain

Chronic low back pain represents a common disabling and costly health problem but unfortunately in 80% to 95% of the patients a pathoanatomical diagnosis cannot be made despite the existence of modern imaging techniques. Specific spinal pathology that fits into a classic disease model which can be accurately diagnosed and appropriately treated is seen in only about 5% to 7% of the patients. This small group of patients with specific diagnosis can be successfully treated with good outcome. The back pain in majority of the patients where no specific pathology exists has been unscientifically labelled as non-specific

low back pain. To date there is no imaging technique or diagnostic test which can localise the source of pain in patients with non-specific back pain. Imaging findings such as degenerated disc, facet arthritis, spondylosis, spondylolysis and spondylolisthesis has no causal relationship to the pain in these patients. The outcome of spinal fusion in these patients is no better than nonsurgical treatment, and spinal fusion is associated with significant morbidity and occasional mortality. Yet there is rapid rise in the rates of spinal fusion. There is a growing tension between ethics and conflicts of interest for surgeons. The spine unfortunately has been labelled as profit centre and there are allegations of conflicts of interest in the relationships of doctors with the multi-billion dollar spinal devices industry. The devices industry has a significant influence on not only research publications in peer review journals but also on decisions made by doctors which can have a detrimental effect on the welfare of the patient.

For spinal fusion to be successful in the treatment of chronic or recurrent low back pain there has to be a pathoanatomical diagnosis which accounts for the pain. The role of spinal fusion in progressive or unstable spondylolisthesis, spinal trauma, tumours and spinal infections is well established. However in patients with nonspecific chronic low back pain a pathoanatomical diagnosis is often impossible to establish.

The disc is implicated in about 40% of the patients with nonspecific low back pain (40). The facet joints is believed to be the source of low back pain in 15 to 40% of the patients (41) while the sacroiliac joint is implicated in about 15% of the patients (42). Though we know that these three are the main sources (but not the only source) of chronic low back pain, no conventional clinical test can discriminate the source of pain in patients with disc, facet joint or sacroiliac joint abnormalities (40,41, 42).

A simple relationship of radiographic structural abnormalities of the lumbar spine and low back pain cannot exist because many individuals with such structural spinal abnormalities are 11 asymptomatic (43). Systematic review of published studies show that there is a lack of firm evidence for a causal relationship, between radiographic findings of degeneration of the spine as defined by disc space narrowing, osteophytes and sclerosis, and nonspecific back pain. Neither does a causal relationship exist between radiographic evidence of spondylosis, spondylolysis, spondylolisthesis, spina bifida, transitional vertebra; Scheuermann's disease and nonspecific back pain (44).

Modern imaging techniques can now allow us to accurately depict the anatomical changes that occur with the degeneration of the disc. However, the clinical significance of these changes depicted on magnetic resonance imaging (MRI) remains elusive and often confusing (45). In asymptomatic adults, degeneration of the disc can be seen in about 40 to 80% of individuals and it increases with age, while disc protrusion can be seen 40 to 70%, end plate changes in 10 to 30% and annular disruption in 25 to 70% of adults who are asymptomatic (46).

Since anatomical diagnostic tests such as radiographs and magnetic resonance imaging (the gold standard) are of not much help in elucidating the cause of nonspecific low back pain, can other tests help in making a decision as to which of the patients with nonspecific low back pain will benefit from surgery?

Despite the lack of proven validity against a gold standard, discography has been used to recommend spinal fusion in patients with nonspecific low back pain. Carragee et al (47) studied the predictive value of provocative discography in patients with discogenic lesion who had back pain and found that at best the predictive value of discography was between 50 to 60%. The usefulness of this test to identify patients with chronic low back who will benefit from a spinal fusion remains unproven. In another study Carragee et al (48) found a false positive rate of 50% in patients with no back pain who had provocative discography.

Can spinal fusion be an effective procedure for treatment of chronic nonspecific low back pain when there are no accurate diagnostic tests to identify patients who will benefit from such treatment?

Studies show that spinal fusion is as effective as conservative treatment in the treatment of nonspecific low back pain (49, 50). Spinal fusion is furthermore associated with significant serious complications (49, 51).

The reason why the rates of spinal fusion for nonspecific low back pain are rapidly increasing appears to be due to financial conflict of interest and the influence of key opinion leaders who are backed by the multibillion dollar device industry (52).

It is quite evident from the review of literature that spinal fusion for chronic non-specific back pain has not lived up its expectation and it is a myth that this group of patients do always benefit from spinal fusion.

Just as for the spine, there is dichotomy between increasing rates of surgery and benefit for the patient, when surgery is routinely carried out for ligament injuries. Here too the driving force appears to be financial incentives.

Surgery For Ligament Injuries

Treatment Of Anterior Cruciate Ligament Injuries

We are all aware that there has been a dramatic increase in the number of anterior cruciate ligament (ACL) reconstructions that are carried out here in Malaysia as well as around the world. The numbers of ACL injuries have undoubtedly increased over the years with greater participation of young adults in sporting activities. However it is not certain whether the increase in the numbers of reconstructions can be accounted for by the increasing numbers of ACL injuries. Without doubt commercial interests as well the

influence of the biomedical companies have a role to play. In the past the rationale for surgical treatment of an ACL tear was that the ACL is vital for knee function and that in the long term ACL deficiency will lead to more injuries of the meniscus and more degeneration of the joint. This belief was prevalent because the natural history of an ACL deficient knee was not known in the past. On the other hand neither was the ultimate outcome of reconstruction of the ACL known in the past. However in past few years a substantial amount research has been published, which has elucidated the natural history of ACL deficient knees as well as the long term outcome of reconstruction of the ACL.

Anterior cruciate ligament (ACL) injury is a common sports injury with over two million such injuries occurring every year (53) or about 78 injuries per 100,000 people (54). An MRI is not necessary for the diagnosis of an injury to the ACL. A positive pivot shift would rule in an ACL tear and a negative Lachman test would rule out a tear of the ACL. Lachman test is best overall for ruling in and ruling out an ACL tear while the anterior drawer test is inconclusive either way (55). The Lachman test has 85% sensitivity and a 95% specificity while an MRI of the knee has 94% sensitivity and specificity in the diagnosis of a tear of the ACL (56). An MRI is useful for excluding other intra-articular injuries such as meniscal and chondral injuries.

The aim of treatment of a person with ACL tear would be to restore function, minimise symptoms, improve quality of life and minimise the risk of future complications (57). Restoration of function, minimising symptoms and improving the quality of life are all interrelated. Hence we need to know what the symptoms are, what the patient can't do and how the quality of life is affected. Level 3 scientific evidence shows that the activity level of the patient would be the most important factor that needs to be taken into consideration in decision making. The more active a person is in pivoting sports, the greater will the need for a reconstruction of the ACL to reach that level of activity (58).

There is a general belief that all ACL injuries must be treated with a reconstruction to minimise symptoms, improve quality of life and minimise risk of future complication such as chondral and meniscal injury. Now there is level 1 scientific evidence that the mid-term (5 years) patient reported and radiographic outcomes between those patients treated with rehabilitation plus early ACL reconstruction and those treated with rehabilitation and optional delayed ACL reconstruction are the same in young active individuals (59). In this study by Frobell et al (59), 51% of the young active individuals who were treated conservatively needed a delayed reconstruction of the ACL. Another study by Neuman et al (60), which excluded professionals and those not willing to reduce their activity level and were followed up for 15 years, the incidence of delayed reconstruction was 23%. This would imply that 77% of the patients with a torn ACL who modify their activity level will not require an ACL reconstruction and among the young active individuals only 50% of the patients with a torn ACL will require a delayed ACL reconstruction.

In the past it was believed that the incidence of meniscal injuries and osteoarthritis would be higher in patient who did not have an ACL reconstruction. However the study by Frobell

et al (59) has showed unequivocally that such a belief has no scientific basis. In fact the study by Neuman showed that the incidence of OA in patients with ACL reconstruction was higher.

About 50% of young active patients will need a delayed reconstruction of the ACL (level 1 evidence). However the cohort of patient in a general population who will need a delayed reconstruction of the ACL will only be about 23% (level 2 evidence) and these will be the type of patients that most orthopaedic surgeons in our country will treat.

In the past, a reconstruction of ACL has been advocated as a requirement for return to competitive sports after a tear of the ACL. Ardern et al (61) have done a systematic review and meta-analysis to determine postoperative return to sports outcomes, after ACL reconstruction surgery. Their review found that although 90% of the patients achieved successful surgical outcome in terms of impairment based measurement of knee function and a 85% successful activity based outcome, only 44% of patients returned to competitive sport and approximately 63% of patients returned to pre-injury level of sports participation.

Swirtun et al (62) in a study involving 46 patients aged between 18 and 50 years, with an acute unilateral ACL tear, where the treatment was self- selected by the patient to have conservative treatment or reconstruction of the ACL, found no difference in activity level at a 5.6 years follow up. In this study 24 patients had conservative treatment and 22 had an ACL reconstruction. In fact the conservative group had a significantly better outcome in the knee related QOL domain of the KOOS than the patients with ACL reconstruction.

Hence it is a myth that all patients with a tear of ACL will need an ACL reconstruction to minimise symptoms, improve quality of life and minimise the risk of future complications. In fact surgery can be associated with serious complications.

We must not forget that surgery for reconstruction of the ACL is a multi-billion dollar industry.

Treatment Of Posterior Cruciate Ligament Injuries

Anecdotal evidence suggests that many surgeons recommend posterior cruciate ligament (PCL) reconstruction for injuries of the PCL. However a review of literature shows that reconstruction of the PCL is not the treatment of choice for PCL rupture. Majority of PCL tears produce a moderate laxity (10mm or less) of the PCL. The recommended treatment for such injuries is conservative with quadriceps muscle strengthening exercises. The treatment of choice for avulsion fractures involving the PCL, when the fragment is large enough to be fixed with a screw, is surgical fixation of the fragment. The treatment of choice for chronic PCL tears is also conservative (63).

Some authors recommend reconstruction of acute PCL injuries with between 10-15mm of laxity, PCL tears with multiple ligament injuries and chronic PCL laxity with severe laxity which does not respond to conservative treatment (63). However, controversy exists because the results of reconstruction are variable and maybe not be any better than in patients treated conservatively (64). Reconstruction of the PCL improves the laxity by about one grade which means to say that patients with a grade 3 (for whom reconstruction is often recommended) laxity will improve to grade 2 laxity. There is also a suggestion that the outcome PCL reconstruction is better for acute injuries (65,66). There may be some justification for surgery for multi-ligamentous laxity of the knee but there appears to be no good studies with large enough number of patients to substantiate a successful outcome of such surgical procedures.

On the other hand conservative treatment of isolated tears of the PCL is associated with good outcome. Parolie and Bergfeld (67) studied 25 athletes with isolated PCL tears who were treated conservatively and followed up for a mean of 6.2 years (2.2 to 16 years). The patients were evaluated both subjectively and objectively. At follow up 80% of the patients were satisfied with their knee and 84% had returned to their previous sport. The amount of laxity on KT-1000 arthrometry did not correlate with return to sports or knee satisfaction. The authors concluded that athletes with isolated tears of the PCL who maintain their muscular strength return to sports without functional disability.

Shelbourne et al (68) in prospective study of 133 athletically active patients with an isolated acute tear of the PCL, who were treated nonoperatively and followed up for an average of 5.4 years (2.3 to 11.4 years) found that the patients had a good functional outcome irrespective of the degree of laxity of the PCL. The mean modified Noyes score was 84.2, the mean Lysholm score was 83.4 and the Tegner activity score was 5.7 in the patients. Patients with greater laxity did not have poorer scores. Regardless of the degree of laxity 50% of the 15 patients return to same sport at the same or higher level, on third returned to same sport at same or lower level and one-sixth did not return to sports. The degree of laxity of the PCL did not correlate with the functional outcome or the degree of radiological joint space narrowing.

Shelbourne et al (69) in another study, followed up 68 patients with an acute isolated tear of PCL who were treated non-operatively, for an average of 14.3 years (10-21 years). They found that the mean quadriceps strength was 97% of the opposite side, the range of movements was normal, and 59% had normal radiographs, 30% had near normal, 9% had abnormal and 1% had very abnormal radiographs of the knee. At 17 years follow-up the mean functional scores were good and the prevalence of moderate to severe OA was only seen in 11% of the patients (severe 1%). There were no differences in functional score between the laxity grades.

The good outcome of conservative treatment of isolated PCL tears, irrespective of the degree of laxity, as seen in these long term studies, makes one wonder why the need to treat patients with acute or chronic tears of the PCL with surgery. Even the incidence of

moderate to severe post-traumatic OA after PCL injuries is only about 11% with about 1% having severe OA.

It is a myth that patients with PCL tear need surgical reconstruction to improve function or minimise the risk of OA. Studies in patients with ACL reconstruction have showed that surgery does not reduce the incidence of post-traumatic OA (one study showed the incidence to be higher after reconstruction of the ACL).

Treatment Of Lateral Ligament Injuries Of The Ankle

There are many surgeons who recommend a repair of grade 3 injuries of the lateral ligament of the ankle but there is no evidence that such surgery gives better results than conservative treatment.

Pihlajamaki et al (70) did a prospective randomized controlled trial to compare surgical versus functional treatment for acute ruptures of the lateral ligament of the ankle in young men.

The study conducted between 1991 and 1992 recruited physically active Finnish male defence forces personnel with an average age of 20.4 years. All the patients had a grade 3 tear of the lateral ligament of the ankle which was confirmed by stress radiography. Twenty five patients were randomly allocated to the surgical repair of ligament group while 26 were allocated to functional conservative treatment group.

At a mean follow up of 14 years, 60% of the surgical group patients and 69% of the functional treatment group were available for review. All patients in both groups had recovered the preinjury activity level and they could walk and run normally. There was no significant difference in the ankle scores and the findings on stress radiography between the two groups. However the re-injury rate was significantly higher in the functional treatment 16 group. In the surgical group about 27% had evidence of osteoarthritis but none of the patients in the functional group had evidence of osteoarthritis.

The authors of this level 1 study concluded that in terms of recovery of preinjury activity level the long term results were the same in both groups. There was no difference in the objective ankle stability on stress testing in both groups. There was a risk of osteoarthritis in the surgically treated patients whereas there was no osteoarthritis in the conservatively treated group at a mean follow up of 14 years. There was a significantly higher rate of reinjury in the non-surgical group but the re-injury posed no major problem since the subjective recovery and physical activity level was the same in both groups. None of the patients in either group had surgery for ankle instability.

Takao et al (71) in a level 3 cohort study of 132 patients comparing surgical with functional treatment of lateral ligament injuries found no difference in the mean results of the clinical scores and ankle stability on stress radiography between the two groups at 2 years follow

up. However in this study 10% of the patients (8 of 78 patients) in the functional group had a functional score of less than 80 points and had instability on follow up.

A higher rate of re injury or instability of the ankle on follow up in patients treated conservatively after an acute tear of the lateral ligament should not be construed as an indication for surgery of acute tears because surgery can always be carried out at a later date if instability persists without jeopardizing the long term outcome. Kitaoka et al (72) did a retrospective 10 years follow up study which compared the outcome of acute and delayed reconstruction for lateral ligament instability and found that the radiological and clinical results were similar in the two groups.

The treatment of choice for lateral ligament injuries of the ankle is conservative and it is myth that surgery should be done for grade 3 injuries of the ankle.

Conclusion

There are several reasons why such myths continue to be perpetuated by the medical fraternity. One of the reasons is that most medical professionals who are not affiliated to academic institutions (not that they do not perpetuate myths) do not have the time or incentive to keep up with the latest development in medicine. Besides that there is the problem of a huge number of publications that are churned out on a regular basis, some of which is good evidence based medicine but most of it is not what helps us bust myths. Scientific meetings and congresses is not the best avenue to obtain knowledge about evidence based medicine because many of these meetings are sponsored by the multi-billion dollar pharmaceutical and surgical devices industry and there is conflict of interest involved at such congresses.

Another reason why myths cannot be busted is conflicts of interest in medicine. Conflicts of interest in medicine has created deep concerns about the integrity of medicine and raised doubts about the trustworthiness of the medical professional. New stories of conflict of interest in medicine have become a commonplace. The interactions between the medical professional and the biomedical device as well as the pharmaceutical industry has become so pervasive that the primary interest of the medical professional in protecting and promoting the welfare of the patient has been compromised. The professional judgement and actions have been influenced by secondary interests, the major fungible and quantifiable being financial interest. The industry influence not only affects the way we practice orthopaedics but also affects medical education and peer review publications. Peer review publications have been shown to exaggerate benefits of the industry products while at the same time downplaying the risks (73).

There is no doubt that we have to make a concerted effort to debunk myths to redeem our worthiness and to provide the best care possible for our patients notwithstanding the fact that medicine is not a perfect science but an art based on science.

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