INTERNATIONAL
E-Journal
Of Science, Medicine And Education

JULY 2018 | IeJSME 2018 VOL 12 (2) ISSN 2231-8194

EDITORIAL

INTERNATIONAL E-JOURNAL OF SCIENCE, MEDICINE AND EDUCATION (IEJSME)

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EDITORIAL

ORIGINAL ARTICLE

CASE REPORT

Towards Sustainable Food and Nutrition - View Points from Early Career Researchers

Sangeetha Shyam[1] and Harriet Elizabeth Smith[2]

In rapidly developing Asian economies, populations are moving from undernourishment and famine, to obesity and overconsumption, referred to as nutrition transition (NT). Yet simultaneously, with observed widening equalities, undernutrition and its health impacts co-exist with over-nutrition. Healthcare systems of developed countries are struggling to cope with diseases of over-nutrition, while literature suggests the re-emergence of nutritional deficiencies such as scurvy and rickets in these areas.[1] While nutritional concerns have temporal and population-specific dimensions, maintaining healthy eating behaviour remains a global challenge. In this editorial, we outline some of the challenges and emphasise the need to collaboratively address them, towards making food and nutrition systems and healthier eating sustainable.

Current Challenges to Sustainable Food and Nutrition

Mixed messages and issues of trust

Food is basic to human existence, and nutrition research finding are frequently translated into practice by the public with or without professional guidance, since they are within the scope of individual agencies.[2] Health experts are therefore wary when unresolved technical debates in nutrition science such as those on the levels of dietary fat or carbohydrate composition, are played out in the public arena. Additionally, studying associations of single nutrients or food with health outcomes, whilst academically engaging, are limited in terms of their translatability. Irresponsible and out-of-context coverage of these findings by the media result in dissemination of conflicting messages such as "coffee can be good for you" and "also bad for you". With the explosive growth in free and accessible online media, combined with the post-truth era media's consumption of sensationalism, unconventional nutrition research and inaccurate reporting of results are more likely to find its way into people's homes. Evidence suggests that these contradictory messages can cause confusion and may lead people to doubt even sensible messages (e.g., messages encouraging fruit and vegetable consumption and exercise).[3] It is therefore increasingly challenging for nutritionists and dieticians to encourage consumers to have healthier diets.

Existing food environment and the impact of nutrition interventions

Food-systems encompass all sub-systems and processes involved in food production, storage, transport and trade; food transformation; and food retail and provisioning. They define the food environment within which an individual exerts their food choice, based on personal preference for taste, price, convenience and perceived health value.[4] Thus, an individual exerts his or her personal priority or preference within the constraints of what is available and easily accessible. Food industry and voluntary or statutory regulations they operate within determine the nutritive value of foods available in an environment.[5] Healthy diets are not always economical, tasty, easily available or convenient to be accommodated within busy lifestyles. Furthermore, they may not be aligned to the focus of existing food-systems. It is therefore not uncommon, that nutrition interventions aimed at improving public health and wellbeing have had limited impact.[6]

Sustainability of the current food-systems

21st Century advances in food production and agriculture have been instrumental in reducing undernutrition, despite the booming population growth that has occurred.[7] While this development is impressive in terms of its socioeconomic and health impacts, it has come at a heavy cost to the environment. Globally, agriculture accounts for up to 30% of greenhouse gas emissions, and makes substantial demands on land (land usage, soil fertility etc.) and water resources.[8] The environmental degradation in turn negatively affects food production. Researchers using modelling have predicted declines in tropical cereal production and global fruit and vegetable supply, largely due to biodiversity declines associated with crop pollination and soil quality.[7,9] Food and nutrition systems will therefore have to address

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the expected increase in demand for food supply in the face of potential unsustainability of the current food production systems.[7]

Increasing food demand raises an urgency for deeper understanding of nutrition and its interaction with planetary health. Emerging areas of research are examining the impacts of dietary patterns on global greenhouse gas emissions[7], and consequentially promoting the adoption of a "less meat" diet.[9] Other efforts at reducing the environmental cost of food involve encouraging consumption of locally grown food and minimising food wastages.[9] However, these efforts may be insufficient given the spiralling rate at which climate change, soil degradation and water scarcity threaten to change our food environment. Thus "business-as-usual" in food-systems, may no longer be acceptable, because it may no longer exist.

The food-system also interacts in complex ways with local and global environments defined by national agricultural and economic policies, trade agreements, cultural expectations, urban-rural divides and migration. The complexity of today's food-systems calls for newer and more holistic approaches to plan relevant and sustainable nutritional interventions. The narrow engagement adopted by traditional food and nutrition initiatives may be limited in its ability to deal with challenges of future.[8] Sustainable nutrition can be assured only when the diets are nutritious, healthy, economical, socio-culturally appropriate, environmentally friendly and support long-term adherence.[9]

The Way forward for Sustainable Food and Nutrition

Professional presence in the public domain

To counteract misinformation currently prevalent in the public domain, access to reliable and evidence-based nutrition information that is consistent, relevant, attractive and easily comprehensible, should be provided. Professional bodies and academia could spearhead such efforts, develop a strong public presence, and actively engage with media to ensure appropriate and balanced reporting. The choice of media to deliver these nutrition promotion messages needs to look beyond the traditional public talks and print media. There are model initiatives[6] that show that web-based dietary interventions can be successfully scaled up to deliver cost-effective and efficient public health interventions. Economical and effective ways to reach individuals and populations may therefore involve embracing digital technologies, including the use of television and social networking platforms that have a greater reach among today's younger generations.

Personalising nutrition

Since one "nutrition message fits all" is increasingly being questioned, tailoring of nutritional interventions may improve their effectiveness.[6] This emphasises the need for funding and generating local evidence. As this need moves towards precision nutrition, it becomes necessary to deploy a wide range of approaches including data analytics. While commercial DNA kits to prescribe personalised diets are available globally, more academic research in this area to validate these methods and processes becomes important and urgent. The impact on health outcomes and cost-effectiveness of personalised nutrition solutions offered to individuals and population sub-groups needs evaluation. If improved outcomes result from such measures, higher compliance to such dietary recommendations and sustainability of these interventions would be added an advantage.

Transitioning to more sustainable food-systems with a multi-disciplinary approach

The complexity of food-systems' influence on eating behaviours, and consequentially population nutrition and health, requires that research and decision-making in nutrition requires a wider skill set and the ability to collaborate with multidisciplinary teams. There is a need to adopt systems-approach in nutrition to study the interactions of interest such as those between nutritional status, food environment (including food production,

processing, distribution, consumption, and policy), migration and town planning. Understanding these interactions can help create sustainable approaches that simplify making healthy choices.[10] without placing the onus on individuals to show restraint while making these decisions. Better understanding of the effects of food production on planetary health will provide opportunities to mitigate or reduce these impacts, which will become increasingly important as demand for food continues to rise.[8] Thus, understanding the food-systems environment and their interaction with population nutrition and health requires a multidisciplinary approach involving a range of stakeholders, such as agriculturalists, environmentalists, policy makers, urban planners, food manufacturers, distributors, economists and data scientists and citizen scientists. There is a real need for these efforts to coalesce and synergise, which requires agreement between experts, and a culture that allows multidisciplinary teams to learn, share and evolve with the ultimate goal of sustainable health promotion.

With an overarching aim to shape sustainable and conducive food policies, academicians, scientists, policy makers and interested citizens could galvanise their efforts by forming advocacy groups. Through creating awareness, such advocacy groups would help improve public trust and support for nutrition promotion. This may result in the empowerment of the involved communities who identify their food and nutrition problems and solve them with professional help. If committed and impactful, such advocacy groups would help make sustainable food, nutrition and health a reality.

These are exciting times for nutrition research. Nutrition is cognisant of issues of trust and the need for reform in nutrition research[2] and hence is well-placed to circumvent them. However, increasingly complex nutrition challenges posed by variations in individual response, urbanisation, migration and the significant changes in planetary health, may require adoption of more robust and holistic approaches that are not necessarily conventional. Nutritional guidelines must also be based on local research. These measures necessitate building capacity and an appreciation for multidisciplinary collaboration among food and nutrition professionals to understand these new dimensions.

Keywords: Sustainability, nutrition, food systems, environment, diet

REFERENCES

1. An overview of links between obesity and food systems : implications for the agriculture GP agenda (English). [Internet]. World Bank Group. 2017. Available from: http://documents.worldbank.org/curated/en/222101499437276873/An-overview-of-links-between-obesity-and-food-systems-implications-for-the-agriculture-GP-agenda.
2. Ioannidis JA. The challenge of reforming nutritional epidemiologic research. JAMA. 2018.
3. Nagler RH. Adverse outcomes associated with media exposure to contradictory nutrition messages. Journal of Health Communication. 2014;19(1): 24-40.
4. Goldberg JP. Nutrition communication in the 21st century: what are the challenges and how can we meet them? Nutrition. 2000;16(7): 644-6.
5. Scattergood G. Special Report — How to tackle Australia's obesity epidemic: Coca-Cola Amatil, Fonterra and Nestlé have their say. William Reed Business Media Ltd.; 2018.
6. Ordovas JM, Ferguson LR, Tai ES, Mathers JC. Personalised nutrition and health. BMJ. 2018;361:bmj. k2173.
7. Tilman D. Global environmental impacts of agricultural expansion: The need for sustainable and efficient practices. Proceedings of the National Academy of Sciences. 1999;96(11): 5995.
8. Dangour AD, Mace G, Shankar B. Food systems, nutrition, health and the environment. The Lancet Planetary Health. 2017;1(1): e8-e9.
9. Meybeck A, Gitz V. Sustainable diets within sustainable food systems. Proceedings of the Nutrition Society. 2017;76(1): 1-11.
10. Bleich SN. A Road Map for Sustaining Healthy Eating Behavior. New England Journal of Medicine. 2018;379(6): 507-9.

Patient's level of satisfaction with nurse-led telephone follow-up after cataract surgery at a private eye specialist centre in Penang

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Introduction: The prevalence of cataract surgeries ranges from 7 to 12 million cases in 2000, 20 million in 2010 and an estimation of 32 million cataract surgeries annually by the year 2020 worldwide (WHO, 2015). Traditionally, the healthcare providers were only able to give health education before the patient is discharged from the healthcare setting while follow-up can only be done when the patient comes for their follow-up. But most of the patients will remain confused or had forgotten about the post-operative care even after receiving a comprehensive discharge preparation. However, with the advancement of technologies in this modern era, nurse-led telephone follow-up can be considered as a tool to assist healthcare providers in the follow-up care in Malaysia. On the same note, a private eye specialist organisation with centres throughout Malaysia, had taken the initiative to provide telephone follow-up service for their patients with three main objectives namely, to provide pre- and post-education on cataract surgery, to detect early post cataract surgery complications as well as to minimise anxiety among their patients. However, till date no patient feedback regarding the service was conducted.

Objective: The research objective for this study was to determine patient's level of satisfaction with the nurse-led telephone follow-up after cataract surgery at a private eye specialist centre in Penang.

Method: A cross sectional quantitative descriptive study design was used to study ninety post cataract patients in a private hospital, Penang through universal sampling method. A validated self-developed questionnaire based on the three main objectives of the telephone follow-up service was used for this study.

Results: Overall, the level of patient's satisfaction with nurse-led telephone follow-up after cataract surgery at a private eye specialist centre in Penang was high (49.9 ±4.85) especially for the health education provided (4.18 ±0.21) followed by the effort to detect early complications (4.16 ±0.12) and to minimise patients' anxiety level (4.16 ±0.12).

IeJSME 2018 12(2): 4-13

Keywords: cataract surgery, level of satisfaction, nurse-led telephone follow-up, patient

Introduction

Cataract is clouding of the eye's natural lens that affects vision, and is very common in older people as most cataracts are related to ageing (Bailey, 2015). Therefore, cataract surgery is a common surgery for elders other than children, in order to restore their vision. According to WHO (2015), there will be a marked increase in the number of cataract surgeries under Vision 2020 especially in the developing country. The prevalence of cataract surgeries ranges from 7 to 12 million cases in 2000, 20 million in 2010 and an estimation of 32 million cataract surgeries annually by the year 2020 worldwide.

Surgery is a major event in an individual's life as patients may need to go through emotional changes pre-operatively, and even lifestyle changes post-operatively. Pre-operative patient education was introduced during the 1960s and became one of the important responsibilities for nurses to reduce the risk during surgery and improve health behaviours and post-operative status (Ali, Lalani & Malik, 2012). The duration of hospital stay and time available for conducting health education to patients are becoming shorter due to cost cutting in the healthcare sector (Fink et al., 2013), whereby most of the cataract surgeries are treated as day cases. Missed appointments and noncompliance with the post-operative care are major causes of inefficiency in healthcare delivery and may lead to other complications, such as infection or delay in healing. The main reason for missed appointments is due to patients' forgetfulness (Urganci, Jongh, Jamsek, Atun, & Car, 2013). It could happen especially for post cataract surgery patients as most cataract patients are the aged (Dahl, 2015) and tend to be forgetful. Evidence suggests that postsurgical complications occur in at least seven million cases annually, resulting in up to

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one million deaths (Fink et al., 2013). Traditionally, the healthcare providers were only able to give the health education advice before the patient is discharged from the healthcare setting, and the follow-up can only be done when the patient comes for the follow-up. With the advancement of technologies, telephone follow up is slowly being adopted as a tool for assisting healthcare providers in follow up care.

Nurse-led telephone follow-up services had been implemented since 2010 by all eye specialist centres of this particular organisation, to provide a comprehensive discharge planning based on a standard guideline to prevent health complications and re-hospitalisation of all post cataract patients. The registered nurses conduct a pre-operative health education session to all patients with cataract including those who are scheduled for operation in this private eye specialist centre. Pamphlets regarding medication instruction, preparation checklist and recommended post-operative activity schedule will be distributed to their patients, and they are encouraged to ask questions if there are any doubts. After the operation, the nurses will follow-up on the discharged patients through telephone according to a standard guideline where information about their eye condition, medication instruction, recommended activity, 24-hour emergency contact, and reminder about their appointment date will be reemphasised. However, no follow up or study had been conducted to determine patient's satisfaction with this nurse-led post discharge telephone follow-up service since it first started in 2010.

Hence, this study will assist in evaluating the patient's level of satisfaction with nurse-led telephone follow up post cataract operation at this private eye specialist centre, Penang. The purpose of this study was to determine patient's level of satisfaction with the nurse-led telephone follow-up after cataract surgery at a private eye specialist centre in Penang.

Methods

Study design, setting and sample

A cross sectional quantitative descriptive study design was used to establish the patient's level of satisfaction with nurse-led telephone follow-up after cataract surgery at this eye specialist centre. The target population for this study were adult patients who had cataract surgery done in this centre and had received telephone follow-up conducted by nurses.

The total number of cataract inpatients in this hospital is estimated to be 50 patients per month. Therefore, the estimated population size is 100. Based on Raosoft sample size calculator with a 5% margin error, 95% confidence level, the minimum sample size required is 80 respondents. An additional 10 % was added to the sample size for attrition, thus making it a total of 88. A total of 90 respondents were recruited for this study over a period of one month through universal sampling method. The inclusion criteria for this study are patients who are first time post cataract surgery patients in this centre, able to read and understand English or Malay language, and received telephone follow-up after surgery. Respondents who were excluded from this study were post cataract surgery patients who did not have their cataract surgery done in this centre or had done cataract surgery prior to this surgery, unable to read and understand English or Malay language, and did not receive telephone follow-up after surgery.

Ethical consideration

Ethical approval was obtained from the ethics committee of the university, eye specialist centre management and informed consent obtained from the respondent's prior commencement of the study.

Measurement and instrument

A questionnaire was developed based on the three main objectives of the standard operation procedure (SOP) for post cataract discharge telephone follow-up

service of this eye specialist group of hospitals. These three objectives are to minimise the risk of post-operative complications, to follow-up on current post-operative eye condition so as to detect potential complications early and to reassure patient and provide an avenue for patient to verify any concerns with the aim of reducing post-operative patient anxiety. The questionnaire was available in two languages: English or Bahasa Malaysia and consisted of three parts. Part I is on demographic, Part II is a 12–close ended questions to determine the patient's satisfaction with the nurse-led post discharge telephone follow-up; while Part III consisted of two open-ended questions to gather information on other services that they required, and recommendations for further improvement. Each item in Part II is scored using a 5-point Likert scale, where 1= "Very Dissatisfied", 2= "Dissatisfied", 3= "Neutral", 4= "Satisfied" and 5= "Very satisfied".

Validity and reliability testing

A pilot study was carried out and results showed a Cronbach alpha value of 0.90 while a panel of experts consisting of a chief centre manager and nursing manager reviewed the questionnaire for content validity. No amendments were required as they were satisfied with the items in the questionnaire and agreed that the items were relevant.

Data analysis

Data were analysed using SPSS version 20.0. Descriptive statistics were used to analyse the demographic data in the form of frequency and percentage. The level of satisfaction was analysed using descriptive statistics in the form of mean and standard deviation. A score of 12 – 28 indicates low satisfaction level, 29 – 44 indicates average satisfaction level, and 45 – 60 indicates high satisfaction level (Boone & Boone, 2012). Responses for the open ended question will be grouped into categories, and the content interpreted using themes to understand the meaning of the expressed experience. Data analysed was presented in charts

Results

Demographic characteristics

A total of 90 patients participated in this study (Table 1). Majority of the patients were above 65 years of age, Chinese (81.1%) with their highest education level at secondary school (54.4%).

Table 1: *Description of sample (n=90)*

Variable	M± SD	Frequency (n)	Percentage (%)
Age (Years)	66.2±10.8		
20-40		3	3.4
41-64		31	34.4
65 years and above		56	62.2
Gender			
Male		45	50
Female		45	50
Ethnicity			
Malay		9	10
Chinese		73	81.1
Indian		4	4.4
Others		4	4.5
Education			
Primary school		49	54.4
Secondary school		10	11.1
College / University		2	2.3
No formal education		29	32.2

Level of satisfaction with nurse-led telephone follow up after cataract surgery

The level of satisfaction with nurse-led telephone follow-up after cataract surgery was assessed based on the health education provided through phone (4 items), effort to detect early complications (4 items). and effort to minimise the anxiety level (4 items) using a 5-point Likert scale, namely 1= 'very satisfied', 2= 'dissatisfied',

3= 'neutral', 4= 'satisfied' and 5= 'very satisfied'. The study findings are as described below:

i. Satisfaction towards health education provided through phone

Majority of the respondents (n=78, 86.8%) agreed that the information received through phone was consistent with the information given before the operation. A total of 67 (74.5%) reported that they were well informed regarding the signs and symptoms of post eye surgery although 19 (21.1%) remained neutral while 4 (4.4%) were dissatisfied. Similarly, most of the respondents (n=85, 94.5%) felt that the nurses provided clear instructions on how to manage the post-surgery medication such as instillation of eye drops. Only six (6.7%) responded that they were dissatisfied with the explanation received on post-operative activities, such as use of dark eye shield and not to lift heavy objects for a week. Among the four items representing this domain, the item on clarity of explanation on post-operative activities related to the use of dark eye shield, not to lift heavy objects for a week, received the highest mean score (4.4±0.6); followed by item on clarity of instructions on how to manage the post-surgery medication, like. instillation of eye drop (4.3±0.6) and the item on consistency of information given before operation (4.1±0.7). The lowest ranked item was on information received on the signs and symptoms of post eye surgery complications (4.0± 0.8). The mean total score for all four items representing the domain of satisfaction towards health education provided through phone was 4.18 (SD 0.21) which indicated a high level of satisfaction (Table 2).

Table 2: *Satisfaction towards health education provided through phone (n=90)*

Item No	Satisfaction towards health education provided through phone	Dissatisfied n(%)	Neutral n(%)	Satisfied n(%)	Very Satisfied n(%)	M (SD)
B1	The information received through phone was consistent with the information given before operation	4 (4.4%)	8 (8.9%)	59 (65.6%)	19 (21.1%)	4.1 (0.70)
B2	I was informed regarding the signs and symptoms of post eye surgery complications	4 (4.4%)	19 (21.1%)	43 (47.8%)	24 (26.7%)	4.0 (0.80)
B3	Clear instructions were given on how to manage the post-surgery medication i.e. instillation of eye drop	0 (0%)	5 (5.56%)	52 (57.8%)	33 (36.7%)	4.3 (0.60)
B4	Clear explanation was given on post-operative activities i.e. use of dark eye shield, not to lift heavy objects for a week etc.	0 (0%)	6(6.7%)	42 (46.7%)	42 (46.7%)	4.4 (0.60)
	Mean Total Score					**4.18 (0.21)**

Note. Likert scale 1= Very Dissatisfied 2= Dissatisfied 3= Neutral 4= Satisfied 5= Very Satisfied

Satisfaction towards staff's effort in order to detect early complication

A total of 79 (87.8%) respondents gave a positive feedback regarding the effort taken by the nurses to ensure that early signs of complication were detected (Table 3). Only three respondents were dissatisfied (3.3%), while the remainder 14 (15.6%) remained neutral. Meanwhile, 47 (52.2%) were satisfied with the nurses' effort to ensure that complication was detected early and 26 (28.9%) were very satisfied. The mean score was 4.1 (SD = 0.8) which implied that the respondents were satisfied with the nurses' effort to ensure that any signs of complication were detected early. Majority of the respondents, 59 (65.6%) were satisfied and felt that the nurses listened attentively to what they said about the condition of their eye after surgery, while 20 (22.2%) respondents were very satisfied. The mean score for this item was 4.1 (SD = 0.6) which indicated that respondents were satisfied with the nurses' attentiveness. When the respondents were asked about their satisfaction level towards information received regarding whom to contact if they had any problems or needed clarification, only two (2.2%) did not know whom to contact. The mean score was 4.1 (SD = 0.7) which indicated that overall the respondents were satisfied with the item B7 "I knew whom to contact if I have any problems or need clarification". The results showed that majority of the respondents knew when they should come for follow up as shown by the mean score of 4.3 (SD = 0.6). The highest ranked item for patient's level of satisfaction in this domain was item B8, "I knew when I should come for follow up" with a mean score of 4.3 (SD = 0.6). The mean score for the item "The nurse listened attentively to what I said about my eye condition after surgery" was 4.1 (SD = 0.6) while "I knew whom to contact if I have any problems or need clarification" was 4.1 (SD = 0.7). "The nurse really made the effort to ensure that any signs of complication were detected early" (M= 4.1 SD = 0.8). The mean total score for the domain of satisfaction towards staff's effort in order to detect early complication was 4.16 (SD = 0.12) which indicated a high level of satisfaction.

Table 3: *Satisfaction towards staff's effort in order to detect early complication (n=90)*

Item No	Satisfaction towards staff's effort in order to detect early complication	Dissatisfied n(%)	Neutral n(%)	Satisfied n(%)	Very Satisfied n(%)	M*(SD)*
B5	The nurse was really making the effort to ensure that any signs of complication are detected early	3 (3.3%)	14 (15.6%)	47 (52.2%)	26 (28.9%)	4.10 (0.80)
B6	The nurse listened attentively to what I said about my eye condition after surgery	0 (0%)	11 (12.2%)	59 (65.6%)	20 (22.2%)	4.10 (0.60)
B7	I knew whom to contact if I have any problems or need clarification	2 (2.2%)	10 (11.1%)	53 (58.9%)	25 (27.8%)	4.10 (0.70)
B8	I knew when I should come for follow up	1 (1.1%)	5 (5.6%)	47 (52.2%)	37 (41.1%)	4.30 (0.60)
	Mean Total Score					**4.16 (0.12)**

Note. Likert scale 1= Very Dissatisfied 2= Dissatisfied 3= Neutral 4= Satisfied 5= Very Satisfied

Satisfaction towards staff effort in order to minimise the anxiety level

The satisfaction level towards staff's effort in order to minimise the anxiety level was assessed by asking respondents four items with the choice of answers by Likert scale, namely 1= 'very satisfied', 2= 'dissatisfied', 3= 'neutral', 4= 'satisfied' and 5= 'very satisfied'. The results are as presented in Table 4. A mean score of 4.2 (SD = 0.6) was obtained when respondents were asked on their satisfaction level regarding the nurses' willingness to spend time to provide further explanation if they were unsure. This implied that the respondents were satisfied with the nurses' willingness to spend time to provide further explanation if they were unsure. The respondents were also satisfied with the nurses' explanation and perceived that the instructions were given using words which they could easily comprehend (M= 4.1 SD = 0.7). Similarly, the patients thought that the nurses were very professional. They were perceived to be polite, confident and knowledgeable, throughout the telephone conversation (M= 4.1 SD = 0.7). A total of 43 (47.8%) respondents claimed that they were satisfied with item B12, "I knew that I could trust the nurse" while 34 (37.8%) were very satisfied. A mean score of 4.2 (SD = 0.7) indicated that overall the respondents could trust the nurse. Among the four items in this domain, nurses' willingness to spend time to provide further explanation if they were unsure, (M= 4.2 SD = 0.6) and the trust in the nurse (M= 4.2 SD = 0.7) were rated the highest. Overall, the respondents rated a high level of satisfaction towards staff effort in order to minimise the anxiety level (M = 4.16 SD = 0.12).

Table 4: *Satisfaction towards staff effort in order to minimise the anxiety level (n=90)*

Item No	Satisfaction towards staff effort in order to minimise the anxiety level	Dissatisfied n(%)	Neutral n(%)	Satisfied n(%)	Very Satisfied n(%)	M *(SD)*
B9	The nurse was willing to spend time to provide further explanation if I was unsure	0 (0%)	9 (10%)	58 (64.4%)	23 (25.6%)	4.2 (0.6)
B10	The nurse provided explanation and instructions using words which I could easily understand	3 (3.3%)	6 (6.7%)	60 (66.7%)	21 (23.3%)	4.1 (0.7)
B11	The nurse was very professional i.e. polite, confident and knowledgeable, throughout the telephone conversation	1 (1.1%)	12 (13.3%)	52 (57.8%)	25 (27.8%)	4.1 (0.7)
B12	I knew that I could trust the nurse	1 (1.1%)	12 (13.3%)	43 (47.8%)	34 (37.8%)	4.2 (0.7)
	Mean Total Score					**4.15 (0.05)**

Note. Likert scale 1= Very Dissatisfied 2= Dissatisfied 3= Neutral 4= Satisfied 5= Very Satisfied

Comparison mean, standard deviation (SD) and overall satisfaction level score

Comparison among the three domains of satisfaction showed that patients are most satisfied with the health education provided through phone (M = 4.18, SD = 0.21) followed by staff's effort to detect early complication (M = 4.16, SD = 0.12) and the effort to minimise the anxiety level (M = 4.15, SD = 0.05). The overall mean score for this study was 49.9 (SD = 4.85) which indicated a high satisfaction level with the telephone follow-up service. The results were presented in Table 5.

Table 5: *Mean, standard deviation and overall satisfaction level (n = 90)*

Level of satisfaction with nurse-led telephone follow-up after cataract surgery	Mean *(M)*	Standard Deviation *(SD)*
Satisfaction towards health education provided through phone	4.18	0.21
Satisfaction towards staff's effort in order to detect early complication	4.16	0.12
Satisfaction towards staff effort in order to minimise the anxiety level	4.15	0.05
Overall	**49.9**	**4.85**

Note. Likert scale 1= Very Dissatisfied 2= Dissatisfied 3= Neutral 4= Satisfied 5= Very Satisfied
Level of satisfaction: Low satisfaction (12-28)
Average satisfaction (29-44) High satisfaction (45-60)
(Boone & Boone, 2012; Blankenship, 2010)

Discussion

Satisfaction towards health education provided through phone

It was found that majority of the respondents (n = 59, 65.6%) were satisfied with the information received through phone. This could be due to the availability of a standard guide for the nursing staff to provide accurate and standardised information to all patients. This finding is supported by Wong et al. (2011) that standardised institutional discharge planning and policy-driven approach minimises confusion. It is essential for nurses to conduct the pre- and post-operative health education with the same information in order to prevent confusion and frustration. A total of 78 (86.7%) respondents stated that they are satisfied with the congruency of information received. Rothrock (2008) indicated that complicated, confusing and diverse information received could lead to noncompliance of lifestyle changes, delay in healing and increases the risk of infection post-operatively. There are 84 (93.3%) of the respondents who were satisfied with the clear explanation given on post-operative activities. The result is in line with the study done by Houser et al. (2013), where 88% of patients found telephone follow-up helpful. In another study by Harrison, Auerbach, Quinn, Kynoch and Mourad (2014), it was found that telephone follow-up is able to monitor how well the patients cope with lifestyle changes. Based on the transitional care model, it is important to educate patients and family members in order to promote self-management at home and reduce the risk of readmission.

Satisfaction towards staff's effort in order to detect early complication

It is obvious that the respondents appreciate the staff effort in detecting early complication. A total of 81.4% of the respondents valued the staff's effort in ensuring that signs and symptoms of complication are detected early. Naylor and Ware (2015) mentioned that it is important to identify and response to health care risks and symptoms to achieve longer term positive outcomes and avoid adverse events that lead to readmissions. Bowlers et al. (2011) found that telephone follow-up is helpful in detecting early signs of complication, resulting in a 3% decrease in the number of readmission. However, it is very much dependent on the patients' acceptance of this technology. A total of 87.8% of the respondents were satisfied with the staffs' attentiveness when they complain of their eye condition. In other words, telephone follow-up is able to help the nurses in picking up points in order to give suitable advice in preventing post operational complications to the

patients. This finding is consistent with Miller, Barton and Hassan (2012) stating that telephone follow-up for day case surgery allows clinical staff to assess patient recovery, recognise post operational problems and identify insufficiencies in care. The satisfaction level is high due to patients being able to seek advice from nurses in a convenient way, no time limitation, and is free. According to Harrison et al. (2014), the satisfaction level is much more related to whether patients are able to answer a phone call than to the care delivered by the phone call. A total of 93.3% of the respondents came for their appointment date after receiving nurse-led telephone follow-up. This finding is similar to study done by Urganci et al. (2013) which reported that the reminder group has higher appointment rates (80.3%) compared to the control group (67.8%). A study conducted by Huang, Crooms, Chen, Congdon and He (2012) showed that telephone contact can increase medium-term follow-up rates after cataract surgery by three-fold. When missed appointment is common among patients, telephone reminder on the day before the scheduled follow-up date is a good idea to keep the patient reminded on their appointment.

Satisfaction towards staff effort in order to minimise the anxiety level

Trust is crucial in building good nurse-patient relationship (Naylor & Ware, 2015). It was found in this study that 85.6% of the respondents trusted the nurse who attended to them. Cox (2003, as cited in Mistiaen & Poot, 2008) reported that a trustworthy nurse-patient relationship is able to provide emotional comfort for patients which will further increase their satisfaction towards the service provided. However, Kimman et al. (2010) found that nurse-led telephone follow-up had no statistically significant influence on general patient satisfaction ($p = 0.379$) and satisfaction with interpersonal aspects ($p = 0.662$) but regarding access of care, patient satisfaction scores are significantly higher for patients receiving telephone follow-up ($p = 0.015$). Using words and phrases that the patients understand is essential for successful health education to take place. A total of 90% of the respondents agreed that nurses in this specialist centre are able to provide explanation and instructions using words that are easily comprehensible. Since patient engagement is needed for planning and executing the plan of care, the healthcare workers must ensure that the message given to patients are fully understood to uphold the success of transitioning care. This is supported by Rothrock (2008) who stated that simple, clear and easily understood information provided by nurses pre-operatively will help in obtaining optimal patient's outcome. It is agreeable that the anxiety level is reduced after receiving nurse-led telephone follow-up post cataract surgery. Results showed a mean score of 4.15 with a standard deviation of 0.05. This is supported by Thompson-Coon et al. (2013) saying that post operation anxiety can be greatly reduced by telephone follow-up. Besides that, Miller, Barton and Hassan (2012) also stated that patient satisfaction levels were extremely high with telephone follow-up. Therefore, telephone follow-up seemed to be a preferred service for majority of the patients. A total of 90 % of the respondents reported a high level of satisfaction towards nurse-led telephone follow-up. This finding is similar to the study done by Houser et al. (2013) which claimed that 90% of the patients were positive about the initiative of follow-up calls. Hence, we conclude that patient's level of satisfaction with nurse-led telephone follow-up after cataract surgery at a private eye specialist centre in Penang is high.

Response to the two open ended questions was poor where only one responded that he/she was fully satisfied with the service and no other suggestions required.

Limitation

The limitation in this study was that a small convenient sample (n=90) of patients with post cataract surgery was used and it was conducted at one private eye specialist hospital in Penang.

Conclusion

Telephone follow-up is a convenient and economic service which saves transportation time, increases patients' accessibility to specialists. The overall results of this study indicated that most of the patients were satisfied with the nurse-led telephone follow-up after cataract surgery at this eye specialist centre. With the advancement of technology in this era, it is recommended that patients' after care can be carried out with different methods, so that it is more interesting and able to close the gap between nurses and patients. For example, introduction of video call instead of ordinary call will enable nurses to assess the appearance, mood and eye condition. Furthermore, internet application such as 'What's app' or 'We chat' can be used as group chat in order to share the same interest among the patients. It is convenient as they do not need to purposely travel so far in order to meet each other. Auto short message system (SMS) reminder for appointment is recommended too as some patients did not pick up the phone during working time and will still be able to see the message later on. Most importantly, it improves patient self-management and satisfaction.

Acknowledgements

We would like to acknowledge the cooperation from the respective private eye specialist centre, Penang for their support as well as all the patients involved in this study. This project was supported by the International Medical University research grant, BNIO1/2015 (PR-16).

REFERENCES

Ali, R. B., Lalani, N. S., & Malik, A. (2012). Pre-operative Assessment and Education. Surgical Science, 3(1), 10-14.

Bailey, G. (2015). Cataracts. Retrieved February 18, 2015, from http://www.allaboutvision.com/conditions/cataracts.htm

Boone, H. N., & Boone, D. A. (2012). Analysing Likert Data. Journal of Extension, 50(2), 212-214.

Bowles, K. H., Hanlon, A. L., Glick, H. A., Naylor, M. D., O'Connor, M., Riegel, B., & Weiner, M. G. (2011). Clinical effectiveness, access to, and satisfaction with care using a tele homecare substitution intervention: A randomized controlled trial. International Journal of Telemedicine and Applications, 1-13. doi:10.1155/2011/540138 Retrieved September 24, 2015, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3236461/pdf/IJTA2011-540138.pdf

Dahl, A. A. (2015). What are the different types of cataracts? Medicine Net. Retrieved August 4, 2015 from http://www.medicinenet.com/cataracts/article.htm

Fink, C., Diener, M., Bruckner, T., Müller, G., Paulsen, L., Keller, M., & Knebel, P. (2013).

Impact of preoperative patient education on prevention of postoperative complications after major visceral surgery: study protocol for a randomized controlled trial. (peducat trial). Trials 2013, 14 (271), 1-7. Retrieved April 17, 2015 from http://www.trialsjournal.com/content/pdf/1745-6215-14-271.pdf

Harrison, P. L., Hara, P. A., Pope, J. E., Young, M. C., & Rula, E. Y. (2011). The impact of post discharge telephonic follow-up on hospital readmissions. Population Health Management, 14(1), 27-33.

Houser, S. H., Ray, M. N., Maisiak, R., Panjamapirom, A., Willig, J., Schiff, G. D., & Berner, E. S. (2013). Telephone follow-up in primary care: Can interactive voice response calls work? Study in Health Technology and Informatics, 192, 112–116.

Huang, G., Crooms, R., Chen, Q., Congdon, N., & He, M. (2012). Compliance with follow-up after cataract surgery in rural China. Ophthalmic Epidemiology, 19(2), 67-73.

Kimman, M. L., Bloebaum M. M., Dirksen, C. D., Houben, R. M., Lambin, P., & Boersma, L. J. (2010). Patient satisfaction with nurse-led telephone follow-up after curative treatment for breast cancer. BioMed Central Health Services Research, 10:174. Retrieved September 20, 2015 from http://bmccancer.biomedcentral.com/articles/10.1186/1471-2407-10-174

Miller, A., Barton, K., & Hassan, A. (2012). Nurse-led telephone follow-up after day case surgery. Journal for Nurse Practitioners, 8(5), 7-8.

Mistiaen, P., & Poot, E. (2008). Telephone follow-up, initiated by a hospital-based health professional, for post discharge problems in patients discharged from hospital to home (Review). Cochrane database of systematic reviews, 4(4), 2-18.

Naylor, M. D., Bowles, K. H., McCauley, K. M., Maccoy, M. C., Maislin, G., Pauly, M. V., & Krakauer, R. (2013). High-value transitional care: translation of research into practice. Journal of Evaluation in Clinical Practice, 19(5), 727-733.

Rothrock, J. C. (2008). How can a nurse practitioner improve patient compliance and patient education in a perioperative setting? Medscape. Retrieved January 3, 2015 from http://www.medscape.com/viewarticle/566301_5

Thompson-Coon, J., Abdul-Rahman, A. K., Whear, R., Bethel, A., Vaidya, B., Gericke, C. A., & Stein, K. (2013). Telephone consultations in place of face to face out-patient consultations for patients discharged from hospital following surgery: A systematic review. BioMed Central Health Services Research, 13:128. Retrieved April 10, 2015 from http://www.biomedcentral.com/1472-6963/13/128

Urganci, I. G., Jongh, T. D., Jamsek, V. V., Atun, R., & Car, J. (2013). Mobile phone messaging reminders for attendance at healthcare appointments. Cochrane Database of Systematic Reviews, 12.

World Health Organization. (2015). Blindness: Vision 2020 - control of major blinding diseases and disorders. Retrieved May 16, 2015, from http://www.who.int/mediacentre/factsheets/fs214/en/

11 June 2018

Professor Dr Patricia Lim Kim Chooi,
Editor in-chief,
International E-Journal of Science, Medicine and Education,
International Medical University,
Kuala Lumpur,
Malaysia

Dear Editor,

I am writing in to resubmit my manuscript entitled "Patient's Level of Satisfaction with Nurse-Led Telephone Follow-Up After Cataract Surgery at A Private Eye Specialist Centre in Penang". The prevalence of cataract surgeries ranges from 7 million to 12 million cases in 2000, 20 million in year 2010 and an estimation of 32 million cataract surgeries annually by the year 2020 worldwide (WHO, 2015). Traditionally, the healthcare providers were only able to give the health education advice before the patient is discharged from the healthcare setting and the follow-up can only be done when the patient comes for the follow-up. Most of the patients will remain confused or forget the post-operative care even after comprehensive discharge preparation. However, with the advancement of technologies in this modern era, nurse-led telephone follow up can be considered as a tool for assisting healthcare providers in follow up care in Malaysia.

On the same note, this eye specialist organisation with centres throughout Malaysia had taken this innovative service to provide this telephone follow-up service to their patients with three main objectives namely to provide pre and post education on cataract surgery, to detect early post cataract surgery complications as well as to minimise anxiety among their patients. However, till date no patient feedback regarding the service was conducted. Therefore, the research objective for this study is to determine patient's level of satisfaction with the nurse-led telephone follow-up after cataract surgery at a private eye specialist centre in Penang.

This manuscript describes original work and is not currently under consideration nor has it been accepted for publication elsewhere. All authors had read the manuscript and approved its submission. There is no conflict of interest. All authors do not have any affiliations with or financial involvement with any commercial organisation with direct financial interest in the subject or materials discussed in this manuscript. Thank you for receiving our manuscript and considering it for review. We appreciate your time and look forward to your response.

Kind regards

Lim Swee Geok

Nurses' perceptions of self-efficacy in cardiopulmonary resuscitation at a private hospital in Selangor.

Siew Eng Ho and Sok Ching Tee

Introduction: Nurses are obligated to respond competently in the event of cardiac arrest. Nurses could be hesitant to intervene due to low self-efficacy in their ability to manage cardiac arrest patients.

Objective: The objective of this study was to determine the level of nurses' perceived self-efficacy in cardiopulmonary resuscitation (CPR) at a private hospital in Kuala Lumpur.

Method: A cross-sectional descriptive study was conducted with 112 respondents who fulfilled the inclusion criteria. A 19 item questionnaire on Resuscitation Self-Efficacy Scale (RSES) was adapted and scored using a 5-point Likert scale.

Results: The total mean score and standard deviation of perceived self-efficacy score in resuscitation was (M = 77.68; SD ± 11.77) which indicated a high degree of self-efficacy among nurses. There were significant differences between respondents' age groups with (t = -2.520; p = 0.013), unit of working (t = -4.086; p = 0.001), real experiences in resuscitation (t = 2.532; p = 0.013), and the number of participations in resuscitation (t=-6.668; p=0.001) and nurses perceived self-efficacy in CPR. There were also significant differences between respondents' years of working experience with (F = 7.286; p =0.001) and types of last resuscitation training (F= 7.088; p = 0.001). However, there was no significant difference between the nurses' time of their last resuscitation training (F = 1.225; p = 0.298) and the nurses perceived self-efficacy in CPR.

Conclusion: In conclusion, nurses were deemed to possess a high sense of self-efficacy in CPR. This study concluded that nurses' age groups, years of working experience, unit of working, real experiences in resuscitation and the number of participations in resuscitation and types of last resuscitation training are factors contributing towards self-efficacy in CPR performances. However, the time of last resuscitation training reported no significant difference towards nurses' perceived self-efficacy in CPR. Therefore, repetitive CPR and ACLS certification training are pivotal in order to strengthen nurse's self-efficacy in resuscitation and team collaboration through training in this private hospital.

IeJSME 2018 12(2): 14-21

Key words: Nurses, perception, self-efficacy, cardiopulmonary resuscitation

Introduction

Nurses are obligated to respond competently in the event of cardiac arrest that affects thousands of individuals each year in both the before-hospital and in-hospital settings.[1] Effective and high-quality resuscitation performance is essential for nurses acting as the first responders in any cardiac emergencies. It requires a set of coordinated actions represented by the links in the Chain of Survival, and includes immediate recognition and activation, early cardiopulmonary resuscitation (CPR), rapid defibrillation, effective advanced life support and integrated post-cardiac arrest care.[2] When nurses are not delivering an optimum quality resuscitation, this may eventually result in an extended time to intervention and poor prognosis in the patients' chance of survival.[3] A study showed that resuscitation of the cardiac arrest victim is a highly complex task requiring coordination between various levels and disciplines of care providers.[1] Based on the complexity of this task, it should not be surprising that nurses are hesitant to intervene due to a low perception in self-efficacy to manage cardiac arrest patients. Therefore, solutions to improve care provided during resuscitation attempts must be multifaceted and targeted to the diverse number of care providers in achieving survival benefit.

Nurses play a pivotal role in performing multi-faceted tasks throughout the resuscitation process between recognition and post-cardiac arrest care. The common problems encountered during resuscitation are delay in initiating cardiopulmonary resuscitation (CPR), performing ineffective CPR, and uncertainty in the activation of the code blue procedure in a hospital.[4-5]

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The under-preparedness of nurses responding to a resuscitation event may result in an extended time to intervention, and consequently a decrease in chance of survival among patients. Nurses prompting interventions with effective and efficient self-efficacy during resuscitation would enable sustaining the patient's survival to the next phase of patient care. Self-efficacy in resuscitation is defined as a judgment of perceived capability to organize and execute the process of care during resuscitation.[6] According to Pike & O'Donnell,[7] nurses may not be ready for the resuscitation procedures due to lack of resuscitation training, thus attention should be paid to the early recognition and management in order to provide competent resuscitation care. Therefore effective resuscitation training is needed to ensure a high-quality resuscitation performance.

Previous studies have identified that nurses' socio-demographic data such as age, unit of working, and working experience can influence their self-efficacy in performing CPR.[8-9] In addition, time of the last resuscitation training was found to be crucial for a nurse's self-efficacy in performing CPR. Resuscitation self-efficacy is described as a nurse's perceptions or beliefs about their capabilities to organize and execute competent resuscitation care.[10] Perceived self-efficacy in resuscitation is therefore of great importance because it affects the quality of CPR performed on a patient. Previous studies indicated that nurses who had a high level of self-efficacy demonstrate effective chest compression skills.[8] Delaying even a few minutes in cardiopulmonary resuscitation (CPR) will significantly affect patient outcomes.[8,11]

In the U.S., a total of 24% of the survival-to-discharge rate for patients who experienced in-hospital cardiac arrest was reported.[12] In fact, studies revealed that the survival rate statistics vary among countries; for example, Korea (19%), Australia (18%) and UK (10%).[13] Some nurses have been found to have limited confidence and are fearful to initiate CPR on patients.[4] To date, limited studies have been conducted on nurses' perception of self-efficacy in cardiopulmonary resuscitation in Malaysia. In a recent hospital audit, researchers were informed that nurses were not confident in the activation of code blue, and demonstrated inadequate quality of CPR. Self-efficacy is needed to achieve successful clinical performance and competency among nurses.[7] Therefore, understanding the perceived self-efficacy in resuscitation among nurses should not be neglected. The purpose of this study was first, to determine the level of perceived self-efficacy in CPR, and second, to identify the association between socio-demographic data and the level of perceived self-efficacy in CPR among nurses at a private hospital in Selangor.

Materials and Methods

Design

A descriptive cross-sectional design study was conducted from April to June 2017 at a private hospital in Selangor. This hospital is a multi-disciplinary hospital with 108 beds, and employs approximately 130 registered nurses. A convenience sampling of 120 respondents was recruited; 112 respondents (93.3%) had successfully completed the questionnaire.

Data collection and instruments

The research instrument consists of the socio-demographic data (age, years of working experience, unit of working and information on resuscitation training experiences, time since last resuscitation training, and real resuscitation experience) of the respondents. A 19- item self-rate on Resuscitation Self-Efficacy Scale (RSES)[8] with four component structures termed: recognition (4-item); responding and rescuing (9-item); recording (3-item); and reporting and debriefing (3-item) was adapted and modified with permission. A 5-point Likert scale ranging from 1= least confident, 2 = less confident, 3 = neutral, 4=confident, and 5=very confident was used. A total perceived self-efficacy score of more than 63 is considered good, score between 32-62 rate is fair, and less than 31 is poor. A higher total score indicates a stronger participant's belief in

resuscitation self-efficacy. The questionnaire was piloted and a Cronbach Alpha of 0.70 was obtained. Thus, the items were considered to have a relatively high internal consistency and reliability.

Ethical approval

The research was approved by the Joint Committee of Research and Ethics of the International Medical University (IMU) (BN 1/2017: PR-11). The Director of Nursing of the private hospital in Selangor had granted her permission to conduct the study. The privacy and confidentiality of each respondent was maintained, and the respondents were given the right to withdraw from participating in the study.[14]

Data analysis techniques

Data were analyzed using Statistical Package for Social Science (SPSS) version 22 and included descriptive statistics for demographic characteristics, independent t-test and analysis of variance (ANOVA) to analyze the associations between age, years of working experience, unit of working and information on resuscitation training experiences, time since last resuscitation training, and real resuscitation experience with the level of self-efficacy in cardiopulmonary resuscitation of the nurses.

Results

A demographic profile of the respondents is presented in Table 1. The majority of the respondents, 72 (64.3%) were aged 21-30 years. Most of the respondents 57 (51%) had one to five years of working experiences period. A total of 54 respondents (48.2%) reported working in multi-disciplinary wards whilst 58 respondents (51.8%) were in the specialized units of this private hospital. Table 1 also showed the respondents' resuscitation training experiences and real resuscitation experiences. The majority of the respondents (58) (51.8%) had Basic Life Support (BLS) training, 33 (29.5%) respondents had in-house code blue training, 11 respondents (9.8%) had Advanced Cardiac Life Support (ACLS) while 10 other respondents (8.9%) had attended the Neonatal Resuscitation Program (NRP). With regards to the time of last resuscitation training course attended by respondents, the number of respondent with first six months was 85 (75.9%), for one year ago there were 20 respondents (17.9%) and for more than one year, there were 7 (6.3%) respondents. Majority of the respondents (101) (91.15%) reported that they had real experiences in resuscitation while 10 respondents (8.9%) did not have real experiences in resuscitation at the workplace. The number of participations in real resuscitation over a year indicated that for more than eleven scenarios, there were 21 respondents (18.8%) compared with 91 respondents (81.9%) for less than ten times.

Table 1: *The socio-demographic data and resuscitation training experiences and real resuscitation experiences of all respondents (n=112)*

Characteristics	Variables	Respondents (n) (%)
Age	21 – 30 years	72 (64.3)
	31 – 45 years	40 (35.7)
Working experience	1 – 5 years	57 (51)
	6 –10 years	46 (41)
	≥ 11 years	9 (8)
Unit of working	Multidiscipline wards	54 (48.2)
	Specialized units	58 (51.8)
Types of last resuscitation training	BLS	58 (51.8)
	ACLS	11 (9.8)
	NRP	10 (8.9)
	In-house code blue training	33 (29.5)
Time of last resuscitation training	6 months ago	85 (75.9)
	1 year ago	20 (17.9)
	More than 1 year	7 (6.3)
Real experiences in resuscitation	Yes	102 (91.1)
	No	10 (8.9)
Number of participations in real resuscitation	Less than 10 times	91 (81.2)
	More than 11times	21 (18.8)

Table 2 shows the total mean score (M) and standard deviation (SD) of Resuscitation Self-Efficacy Scale (RSES) towards perceived self-efficacy with responding and rescuing as the highest score (M=37.17; SD ± 5.67) followed by recognition attribute (M=17.96; SD ± 2.22); recording attribute (M=12.01; SD ± 2.42); and reporting and debriefing as the lowest score (M=10.54; SD ± 2.61). The respondents' total mean score of perceived self-efficacy score in resuscitation was (M=77.68; SD ± 11.77).

Table 2: *Respondents' perception of self-efficacy in cardiopulmonary resuscitation (n=112)*

Variables	Mean ± (SD)
Recognition	17.96 ± 2.22
Responding and rescuing	37.17 ± 5.67
Recording	12.01 ± 2.42
Reporting and debriefing	10.54 ± 2.61
Total score	**77.68 ± 11.77**

Table 3 shows the association between respondents' age groups, unit of working, prior experiences in resuscitation and number of participation in real resuscitation with the level of nurses' self-efficacy in cardiopulmonary resuscitation. The respondents' age group of more than 31 years old indicated a significantly higher mean score (M=81.35: SD ± 9.99) than those less than 30 years old (M=75.64; SD ±12.24). Respondents working in the specialized units reported a higher self-efficacy score (M = 80.55; SD ± 10.91) than those who worked in the multidisciplinary wards (M = 71.37; SD ± 11.24). Respondents who had real experiences in resuscitation had a higher self-efficacy score (M = 78.54; SD ± 11.76) than those who had no experience in resuscitation (M = 68.90; SD ± 7.81). The findings indicated clearly a remarkable difference in self-efficacy score between respondents who had less than 10 times participation in resuscitation and those who had dealt with more. Respondents who had encountered more than eleven times of participation in cardiopulmonary resuscitations over a year reported a higher self-efficacy score (M = 90.76; SD ± 6.96) than those who had dealt with less than ten times (M= 74.66; SD ± 10.53). There were significant differences between respondents' age groups with the level of nurses' self-efficacy in cardiopulmonary resuscitation (t = -2.520; p = 0.013); unit of working (t = -4.086; p = 0.001); real experiences in resuscitation (t = 2.532; p = 0.013); and number of participations in real resuscitation (t = -6.668; p = 0.001).

Table 3: *Respondents' total mean score (M) and standard deviation (SD) of perceived self- efficacy in cardiopulmonary resuscitation with socio-demographic data (n=112).*

Variables		*Perceived self- efficacy*		
		Mean ± SD	***t***	***p***
Age	Less than 30 years old More than 31years old	75.64 ±12.24 81.35 ±9.99	-2.520	0.013*
Unit of working	Multidisciplinary wards Specialized units	71.37±11.24 80.55±10.91	-4.086	<0.001**
Real experiences	Yes	78.54±11.76	2.532	0.013*
in resuscitation	No	68.90±7.81		
Number of participations in real resuscitation	Less than 10 times More than 11times	74.66±10.53 90.76±6.96	-6.668	<0.001

*Statistically significant p <0.05, ** *p* <0.000

Table 4 shows the respondents' association between years of working experience, the types and time of last resuscitation training with the level of nurses' self-efficacy in cardiopulmonary resuscitation. The respondents who had six to ten years of working experience scored the highest self-efficacy score (M = 82.04; SD ± 10.04) and the lowest core was seen in those with less than five years of working experience (M = 73.75; SD ± 12.37). The highest self-efficacy score respondents were deemed to be those who had attended ACLS (M = 90.55; SD ± 6.22), followed by those who had attended in-house code blue training (M = 79.39; SD ± 11.52), BLS (M = 75.05; SD ± 11.78), and the lowest score was for NRP (M = 73.10; SD ± 5.82). Respondents who attended resuscitation training 6 months ago scored the highest total mean self-efficacy score (M = 78.62; SD ± 12.58), compared to those who had the last resuscitation training 1 year ago (M = 75.25, SD ± 7.55) and more than 1 year ago (M = 73.14, SD ± 10.43). There were significant differences between respondents' working experience (F=7.286; p =0.001); and types of last resuscitation training (F=7.088; p=0.001). However, self-efficacy and time of last resuscitation training produced a non-statistically significant relationship (F = 1.225; p = 0.298).

Discussion

The greater the nurses' resuscitation self-efficacy in responding to emergency situation, the greater would be the expectation for consistently strong determinants and predictors of the level of accomplishment towards successful patient survival.[4] The findings of this study indicated that the nurses working in the private hospital have a relatively high sense of self-efficacy in CPR resuscitation. Congruently, Mäkinen et al. (2016; 2014)[4-5] stated that in Greece and Sweden, nurses' self-efficacy is associated with satisfactory performance of CPR skills, even though an effective resuscitation requires a combination of competencies in knowledge, technical and non-technical skills. However, several studies reported that there were gaps between recommendations from recommended guidelines and reality in CPR training, and the gap between training frequency and real resuscitation experience.[15-16]

Table 4: *Respondents' total mean score (M) and standard deviation (SD) of nurses' perceived self- efficacy in cardiopulmonary resuscitation with socio-demographic data. (n=112)*

Characteristics	Variables	Perceived self-efficacy Mean ± (SD)	*F*	*p*
Years of working experience	1 – 5 years	73.75±12.37	7.286	0.001*
	6 – 10 years	82.04±10.04		
	>11 years	80.22±5.48		
Types of last resuscitation training	BLS	75.05±11.78	7.088	0.001*
	ACLS	90.55±6.22		
	NRP	73.10±5.82		
	In house blue code training	79.39±11.52		
Time of last resuscitation training	6 months	78.62±12.58	1.225	0.298
	1 year ago	75.25±7.55		
	More than 1 year	73.14±10.43		

*Statistically significant $p < 0.05$, ** $p < 0.001$

This study demonstrated that the age and the years of working experience have a significant association with self-efficacy in CPR of nurses. A similar study reported that seniority in terms of age and longer working experiences among nurses resulted in greater self-confidence and ability to manage family-witnessed resuscitation.[17] Work experience may increase nurses' self-efficacy as they become more comfortable in performing such clinical tasks.[18] This can also explain a higher level of self-confidence shown in nurses who have had a longer working experience in managing resuscitation. Other factors may be related to experiential learning and opportunities to perform resuscitation skill that will further strengthen the self-efficacy competencies over time among them. In contrast, a study by Twibell, et al. reported that there was no significant difference between working experience and perceived self-confidence in nurses when managing family-witnessed resuscitation.[17]

The present study indicates that ACLS certified nurses were most confident in their resuscitation skills than other respondents. Gary et al. reported similar findings in that nurses perceived a greater self-efficacy and competency in performing resuscitation skills following completion of the ACLS course.[19] It is pivotal to reinforce ACLS-certification training for nurses to be equipped in managing complex and critically or life-threateningly ill patients in a hospital. Hence, self-efficacy in CPR would enhance how nurses think, feel, motivate and act on the chain of survival in BLS resuscitation protocol.

The perceived self-efficacy in cardiopulmonary resuscitation (CPR) has indicated that nurses who work in specialized units are more confident in resuscitation than those work in non- specialized units. A similar study by Passali et al. stated that nurses who work in emergency departments, intensive care units or anesthesiology departments are competent and confident in resuscitation skills and in the cardiac arrest team in a hospital.[2] A study by Porter et al. (2013) reported that nurses' exposure to a high–acuity clinical environment and complex equipment would enhance their confidence level, and eliminate negative emotions such as nervousness, fear and worry.[20] This may explain a high confidence level of self-efficacy in cardiopulmonary resuscitation (CPR) among nurses who worked in specialized units as reflected in this private hospital in Kuala Lumpur.

Self-efficacy in CPR has a tendency to decline with a longer time period between resuscitation training sessions. Hopstock reported that hospital personnel had moderate self-confidence in CPR skills which decreased over time when the last training lapsed for more than 2 years.[16] Similar to another finding by Partiprajak and Thongpo[21], the respondents in this study, scored the highest self-efficacy in CPR for a reported lapse time of last resuscitation training within six months. Conversely, Montgomery et al. found that nurses who have monthly CPR practice demonstrated a higher confidence level in CPR than those who did not have frequent CPR practice.[22] The reasons why nurses hesitate to initiate CPR may be due to anxiety and lack of confidence despite having undergone CPR training within the past 6 months.[5] Consequently, the reinforcement of CPR training would strengthen a nurse's skills and confidence level to perform CPR. A nurse's perception of good efficacy in CPR was noted among the respondents in this study. The role and responsibility of members in a resuscitation team include promoting inter-professional teamwork and resuscitation experience. Anxiety would affect the nurses' self-efficacy and functioning in resuscitation procedures. Having proper training and support would allay fear of causing harm to a patient and enhance the competency in performing the CPR among nurses.

In addition, nurses who had real experiences in resuscitation possessed a higher self-efficacy score than those who had no experience in resuscitation[23]. In this study, self-efficacy was significantly associated with the number of participations in real resuscitation. Nevertheless, the experience of managing cardiac arrest in real life may increase the confidence of performance, but this may not affirm the competence of those nurses nor assume them as high-performers in a clinical setting.[24]

This study has revealed that the more often nurses had to perform CPR, the better self-efficacy and more confident those nurses will be with CPR. However, only twenty-one respondents had participated in more than 11 real resuscitations over a year. This could be due to the fact that the private hospital chosen as a study site in this survey is a small community hospital, and does not admit critically ill patients with complex conditions. The rarity of patients with cardiac arrest and occasional occurrences of cardiac arrests in their work setting would also explain why the majority of nurses have few exposures to actual resuscitation.

Conclusion

In conclusion, nurses were deemed to possess a high sense of self-efficacy in CPR. Factors related to the nurses' age groups, years of working experience, unit of working, real experiences in resuscitation, the number of participations in resuscitation and types of last resuscitation training contributed significantly towards a high score in the nurses' perceived self-efficacy in CPR. The time of last resuscitation training indicated no significant association between the perceived levels of nurses' self-efficacy in cardiopulmonary resuscitation. Therefore, repetitive CPR and ACLS certification training are pivotal in order to enhance the nurse's self-efficacy in resuscitation and team collaboration through training in this private hospital.

In addition, further studies are recommended to find out what other variables may lead to an increase or decrease in self-efficacy to perform CPR. A quasi-experimental study needs to be conducted to ascertain the outcomes of the CPR and ACLS certification training and inter-professional teamwork in a hospital.

A limitation of this study is the small sample size as well as the fact that the study was conducted in a small private hospital from one geographical location. Thus this limits the generalizability of the study findings among the practicing nurses in Malaysia.

Acknowledgement

This study was approved by the International Medical University Joint Committee on Research and Ethics. (Project ID number: BN 1/2017: PR-11).

REFERENCES

1. Wallace SK, Abella BS, Becker LB. Quantifying the effect of cardiopulmonary resuscitation quality on cardiac arrest outcome: a systematic review and meta-analysis. Circ Cardiovasc Qual Outcomes. 2013; 6(2): 148-56.
2. Passali C1, Pantazopoulos I, Dontas I, et al. Evaluation of nurses' and doctors' knowledge of basic and advanced life support resuscitation guidelines Nurse Educ Pract. 2011; 11(6): 365-9.
3. Heng KW, Fong MK, Wee FC, et al. The role of nurses in the resuscitation of in hospital cardiac arrests. Singapore Med J. 2011; 52(8): 611-5.
4. Mäkinen M, Castrén M, Nurmi J, et al. Trainers' Attitudes towards Cardiopulmonary Resuscitation, Current Care Guidelines, and Training. Emerg Med Int. 2016; 2016: 3701468.
5. Mäkinen M, Niemi-Murola L, Ponzer S, et al. Healthcare professionals hesitate to perform CPR for fear of harming the patient. Resuscitation. 2014; 85(11): e181-2.
6. Olson KR, Caldwell A, Sihombing M, et al. Assessing self-efficacy of frontline providers to perform newborn resuscitation in a low-resource setting. Resuscitation. 2015; 89:58-63.
7. Pike T, O'Donnell V. The impact of clinical simulation on learner self-efficacy in pre-registration nursing education. Nurse Educ Today. 2010; 30(5): 405-10.
8. Roh YS, Issenberg SB, Chung HS. Ward nurses' resuscitation of critical patients: current training and barriers. Eval Health Prof. 2014; 37(3): 335-48.
9. Olson KR, Caldwell A, Sihombing M, et al. Assessing self-efficacy of frontline providers to perform newborn resuscitation in a low-resource setting. Resuscitation 2015; 89: 58-63.
10. Heidarzadeh A, Forouzi MA, Kazemi M, et al. The effect of computer simulation and mannequin on nursing students' perception of self-efficacy in cardiopulmonary resuscitation. Iranian J Med Educ 2014; 14 (10): 876-85.
11. Sharghi NR, Alami A, Khosravan S, et al. Academic training and clinical placement problem to achieve nursing competency. J Adv Med Educ Prof 2015; 3(1): 15-20.
12. Chan, P. Public health burden of in-hospital cardiac arrest. (Institute of Medicine Committee on the Treatment of Cardiac Arrest. 2015. [cited 6 Jan 2017]. Available from www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2015/GWTG.pdf.
13. Chon GR, Lee J, Shin Y, Huh JW, et al. Clinical outcomes of witnessed and monitored cases of in-hospital cardiac arrest in the general ward of a university hospital in Korea. Respir Care 2013; 58(11): 1937-44.

14. Polit DF, Beck CT. Essentials of nursing research: Appraising evidence for nursing practice (8th ed.).2014; Philadelphia: Lippincott Williams & Wilkins.

15. Hicks CM, Bandiera GW, Denny CJ. Building a simulation-based crisis resource management course for emergency medicine, phase 1: Results from an interdisciplinary needs assessment survey. Acad Emerg Med. 2008; 15(11): 1136-43.

16. Hopstock LA. Cardiopulmonary resuscitation; use, training and self-confidence in skills. A self- report study among hospital personnel. Scand J Trauma Resusc Emerg Med. 2008; 16: 18.

17. Twibell RS, Siela D, Riwitis C, et al. Nurses' perceptions of their self-confidence and the benefits and risks of family presence during resuscitation. Am J Crit Care. 2008; 17(2): 101-11.

18. Wilson M, Byers T. Relationship between self-efficacy and work experience in Baccalaureate junior and senior level nursing students. Honors Research Projects, 2017. The University of Akron, United States.

19. Gary JC, Holland B, Mulcahy A. The Impact of Advanced Cardiac Life Support to Baccalaureate Nursing. Int Arch Nurs Hlth Care. 2015; 1:3

20. Porter J, Morphet J, Missen K, et al. Preparation for high-acuity clinical placement: confidence levels of final-year nursing students. Adv Med Educ Pract. 2013; 30; 4: 83-9.

21. Partiprajak S, Thongpo P. Retention of basic life support knowledge, self-efficacy and chest compression performance in Thai undergraduate nursing students Nurse Educ Pract. 2016; 16(1): 235-41.

22. Montgomery C, Kardong-Edgren SE, Oermann MH, Odom-Maryon T. Student satisfaction and self-report of CPR competency: HeartCode BLS courses, instructor-led CPR courses, and monthly voice advisory manikin practice for CPR skill maintenance. Int J Nurs Educ Scholarsh. 2012; 3: 9. pii: /j/ijnes.2012.9.issue-1/1548-923X.2361/1548-923X.2361.xml.

23. Van Schaik SM, Plant J, Diane S, et al. Interprofessional team training in pediatric resuscitation: A low-cost, in situ simulation program that enhances self-efficacy among participants. Clin Pediatrics. 2011; 50(9): 807-15.

24. Roh YS, Issenberg SB, Chung HS, et al. A survey of nurses' perceived competence and educational needs in performing resuscitation. J Contin Educ Nurs. 2013; 44: 230-6.

A palatal swelling transpires out as a nasal B-cell Non-Hodgkin's Lymphoma

Sunil Pazhayanur Venkateswaran[1], Rafiq Abdul Karim Vasiwala[2], Norfadzilah Mohd Yusof[3]

Abstract

Primary sinonasal Non-Hodgkin's Lymphoma's (NHLs) are quite rare and emulate the presentation of benign inflammatory diseases. It is challenging to distinguish them morphologically and radiologically from other malignant neoplasms.

We report a 37-year-old male patient who presented with obstruction of the nasal passages, rhinorrhoea, epistaxis, post nasal drip, facial swelling, orbital symptoms and pyrexia. The mass was a nasal diffuse large B-cell lymphoma confirmed by immunohistochemistry. After the first cycle of chemotherapy was started, the patient improved with resolution of the facial swelling, pain and visual defects.

A high index of suspicion is required to differentiate sinonasal lymphomas from other lesions.

IeJSME 2018 12(2): 22-25

Keywords: Diffuse large B-cell lymphoma, palate, CD20, CD79α, and KI-67.

Case Report

Introduction

Lymphomas constitute a group of malignant neoplasms of the reticuloendothelial system which are divided into Hodgkin's disease and Non-Hodgkin's lymphomas (NHL).[1] NHL is a heterogeneous group of diseases with peculiar, morphological, molecular and phenotypic molecular features (B-cell neoplasms, T-cell neoplasms and putative natural killer (NK)-cell neoplasms). [2]

The nasal cavities and paranasal sinuses are rarely affected by primary NHL. The usual primary extra-nodal sites of lymphomas include bone marrow, bone, stomach, liver, soft tissue, meninges, lower gastrointestinal tract and others.[3] Geographical factors play an important role in the incidence and the histological subtype of sinonasal NHL. In Asian populations, nasal lymphomas are more commonly T-cell lymphomas, whereas B-cell subtypes are frequently more common among the sinonasal lymphomas seen in Western populations.[4]

They emulate the presentation of benign inflammatory diseases. It is challenging to distinguish them morphologically and radiologically from other malignant neoplasms.

Case Summary

A 37-year-old male patient who was referred to our hospital, presented with obstruction of nasal passages, rhinorrhoea, epistaxis, post nasal drip, facial and right hard palate swelling and orbital symptoms for 5 months and pyrexia. The symptoms did not resolve with antibiotics. His right ocular movements were restricted in all gazes.

Endoscopic examination revealed a narrow nasal passage and a mass covered with blood stained pus involving the right middle meatus and extending to the posterior choana of the right nasal passage. The right Fossa of Rossenmuller and nasopharynx were normal.

A CT Scan revealed a right sinonasal tumour with local infiltration seen in all sinuses as well as erosion of the hard palate.

A punch biopsy of the nasal mass was taken which was reported as chronic inflammation. Considering this histopathological finding, endoscopic sinus surgery was performed to eradicate the disease as well as obtain a definite histological diagnosis. The mass was histologically proven as a Nasal diffuse large B-cell lymphoma(DLBCL) [Figures 1 and 2] and confirmed by immunohistochemistry. Immunohistochemically, the cells were strongly positive for CD20 [Figure 3], CD79a, BCL2 [Figure 4], BCL6 [Figure 5] and MUM1 [Figure 6]. CD10 was focally positive. Ki-67 index was <99% [Figure 7].

After confirmation of the histological diagnosis, chemotherapy (R CHOP) was started and with the first cycle, the patient improved with resolution of the facial swelling, pain and visual defects.

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Discussion

These primary NHLs of the sinonasal tract develop in an anatomic space expanding towards the nasal cavity and sinus, without producing any symptoms at the early stages and hence an early diagnosis is unusual. The presenting symptoms appear only when adjoining anatomic structures are involved and the tumours reach a considerable size, and they may pose as other head and neck or nasal findings.

These lymphomas most commonly present with symptoms of unilateral nasal, facial or cheek swelling and obstruction of the nasal passages.[5] Other, uncommon symptoms include visual disturbances like diplopia or blurred vision and pain in the nasal or cheek regions. Sometimes, a patient will present with congestion of the nasal passages and discharge or a history of a problem resembling chronic sinusitis.

Our patient also presented with nasal congestion and discharge and was suspected to be suffering from chronic sinusitis. This led to him having a delay in treatment and worsening of his symptoms with the onset of facial swelling and visual difficulties.

The patterns on radiology are classically of large tumours with a locally infiltrative growth pattern resulting in the sinus walls showing prominent bony erosion. Destruction of the orbital soft tissue and osseous are usually seen in high-grade B-cell tumours. CT scans are especially useful in evaluating the involvement of the sinuses and orbits and extent of the destruction and should be regarded as the gold standard of management., There is a decrease in recurrence and metastasis with the use of combination chemotherapy, especially an anthracycline-based chemotherapy (i.e. CHOP), and local radiation. This results in an overall improved survival without notable side effects.[5]

Conclusion

Primary sinonasal NHLs are rare neoplasms. In order to achieve optimal treatment results, early diagnosis and staging of these tumours with appropriate treatment are vital, and it is crucial that the ENT surgeon be acquainted with their clinical presentation and management.

Acknowledgements

We would like to thank Dr. Manoharan Madhavan(MBBS., MD (Path), MIAC), Consultant Pathologist ,Gribbles Pathology Lab, Kuala Lumpur for providing us with the photomicrographs.

REFERENCES

1. Shohat I, Berkowicz M, Dori S, Horowitz Z, Wolf M, Taicher S, et al. Primary non-Hodgkin's lymphoma of the sinonasal tract. Oral Surg Oral Med Oral Pathol 2004; 97:328-31.
2. Harris N, Jaffe E, Stein H, Banks P, Chan J, Cleary M, et al. Acrevised European-American classification of lymphoid neoplasms: a proposal from the International Lymphoma Study Group. Blood 1994; 84:1361-92.
3. Wang J, Sun N, Weinstein S, Canalis R. Primary T-cell-Rich B-cell lymphoma of the ethmoid sinus. A case report with 5 years of follow-up. Arch Path Lab Med 2000; 124:1213-6.
4. Longsdon M, Ha C, Kavadi V, Cabanillas F, Hess M, Cox J. Lymphoma of the nasal cavity and paranasal sinuses. Improved outcome and altered prognostic factors with combined modality therapy.Cancer 1997;80:477-88.
5. Quraishi MS, Bessell EM, Clark D, Jones NS, Bradley PJ. Non-Hodgkin's lymphoma of the sinonasal tract. Laryngoscope 2000; 110:1489-92.

Figures

Figure 1

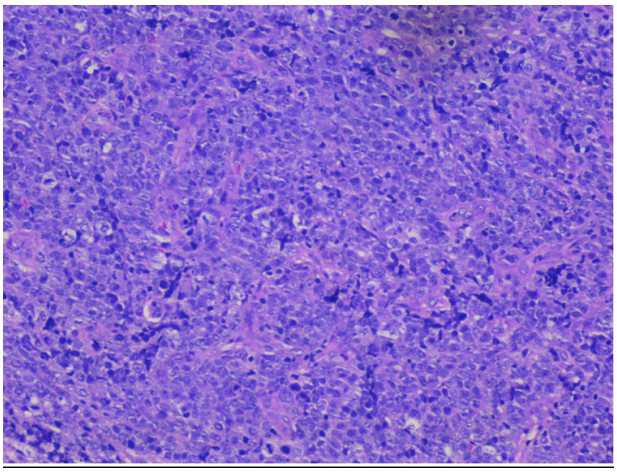


Figure 2

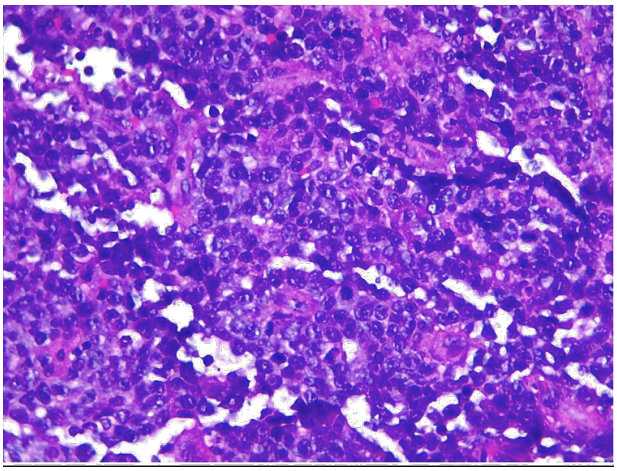


Figure 3

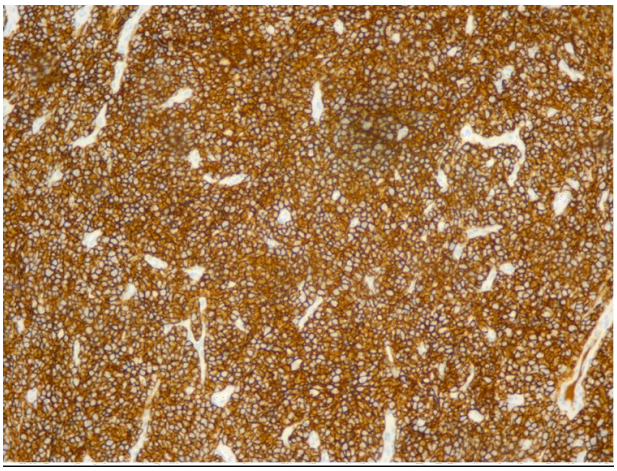


Figure 4

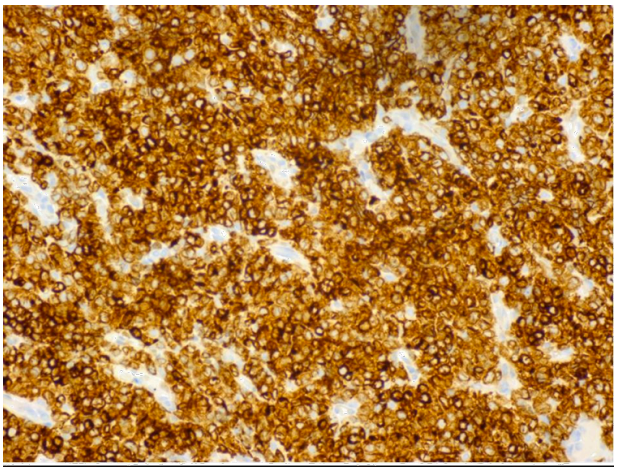


Figure 5

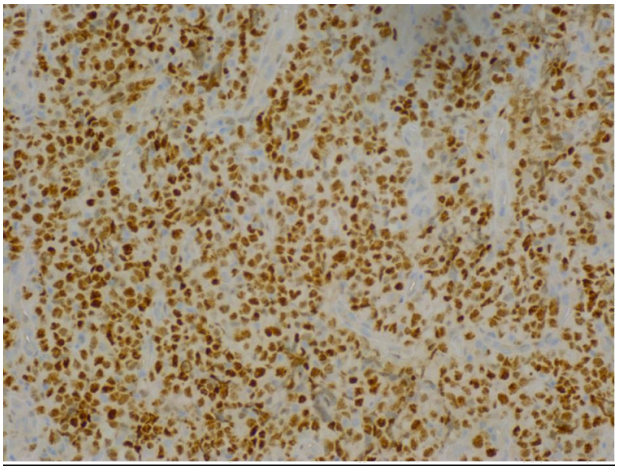


Figure 6

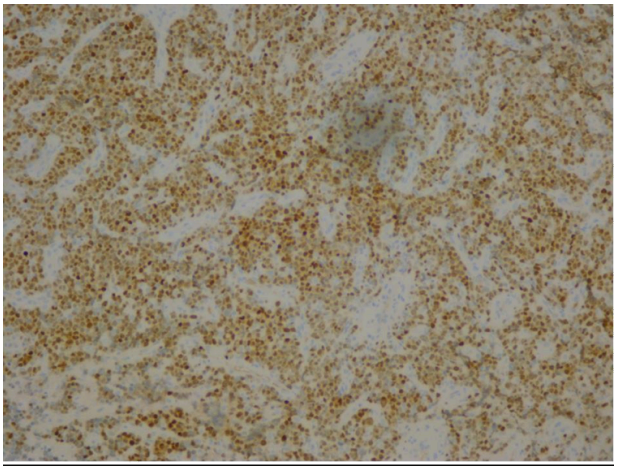
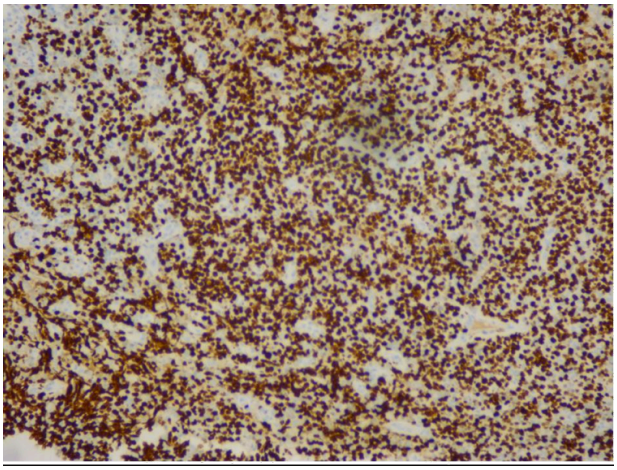


Figure 7



Legends to Figures:

Figure 1: Diffuse large B cell lymphoma. Diffuse infiltration of medium to large size atypical lymphoid cells. H&E stain x200.

Figure 2: Diffuse large B cell lymphoma. Diffuse infiltration of medium to large size atypical lymphoid cells. H&E stain x400.

Figure 3: Diffuse large B cell lymphoma. Immunohistochemistry for the B cell-marker CD20 shows B cell phenotype of the atypical cells. Magnification x 200.

Figure 4: Diffuse large B cell lymphoma. BCL2 staining shows strong cytoplasmic staining.
Magnification x 200.

Figure 5: Diffuse large B cell lymphoma. Neoplastic cells show nuclear staining for BCL6.
Magnification x 200.

Figure 6: Diffuse large B cell lymphoma. Neoplastic cells show nuclear staining for MUM 1.
Magnification x 100.

Figure 7: Diffuse large B cell lymphoma. Immunohistochemistry shows strong staining for Ki67.
Magnification x 100.

Femoral deformity correction and lengthening on nail with monorail external fixator : A case report

Mohd Bakrynizam Abu Bakar Siddiq, Kamarul Izham Kamarudin, Kamarul Al Haq, Suresh Chopr

Abstract

Limb length discrepancy (LLD) is quite common. Lower limb shortening is one of the causes of limb length discrepancy. The common treatment that is used is the llizarov technique for bone lengthening. The new technique uses an intramedullary nail with a monoplanar external fixator. Using this technique, bone lengthening duration in patients can be reduced and knee joint mobility can be improved without jeopardizing bone regeneration. We report a case of a 27-year-old gentleman who had right femur shortening from childhood and was referred to us for corrective deformity. He underwent bone lengthening on the nail which lenghthens and equalizes the leg while avoiding stiffness and reduces joint mobility which leads to good patient satisfaction outcome. The use of the external fixator with intramedullary nailing to lengthen the femur is one method that can reduce patient burden mentally and physically. However although it has many advantages we must watch out for the complications during the regular visits to ensure good outcome.

IeJSME 2018 12(2): 26-29

Keywords: Bone lengthening, limb length discrepancy, external fixator

Introduction

Limb length discrepancy (LLD) is quite common with about 23% of the general population having LLD of about 1cm or more.1 In a study by Guitchet et al, they found that the prevalence of people with LLD requiring corrective device is approximately 1 in 1000. Lower limb shortening is one of the causes for limb length discrepancy. It can be due to fracture complications or congenital defects which will lead to pelvic tilt and secondary scoliosis and in the long-term, could lead to osteoarthritis of the hip, knee and spine.

llizarov is a common technique for bone lengthening. This technique uses systems of rings and anchored using Kirschner wires in tension followed by osteotomy of bone and gradual distraction.

The llizarov method requires the patient to tolerate the long lengthening period which usually presents with complications such as pin site infection and reduced joint mobility. Therefore, considerable physiotherapy is required to prevent permanent joint stiffness, which relies on extreme patient compliance. As a result, the long use of the fixator is not tolerated in most patients.[2] Hence newer techniques have been developed to reduce the complications of the external fixator. One of the new techniques uses an intramedullary nail with a monoplanar external fixator. Using this technique, the bone lengthening duration in the patient can be reduced and knee joint mobility can be improved without jeopardizing bone regeneration.

Case report

A 27-year-old gentleman presented to our clinic with limb length discrepancy due to right short femur. He fell from one floor height at the age of 8 years and sustained trauma to the right lower limb but no fracture was detected. He did not have any symptoms but he started noticing limb shortening when he was 15 years old. He was using his right foot support to minimize the limp. Apart from that, he did not complain of having knee or hip pain yet. Examination revealed shortening of 5 cm in the femoral component of the right lower limb only with full range of movements at the knee and hip joints. There was no abnormality in the spine. Measurement of shortening was confirmed by computed tomography scanogram. After consultation, the patient agreed for femur lengthening procedure using locked intramedullary nailing (Smith and Nephew) and external fixator (Limb reconstruction system; LRS).

Surgical technique

The patient was put in supine position on a radiolucent table. He was given spinal anaesthesia after all the preoperative checklist was done. The patient was cleaned using povidone from the upper pelvis to the tip

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of the right toes, then draped fully in a sterile condition. Initial x-ray was done to check the initial position of the femur. Preoperatively it was concluded from the x-ray that there was shortening of 35mm on right femur with valgus deformity. The anatomical lateral distal femoral angle (aLDFA) was about 76 degrees which was less compared to normal aLDFA of 80 degrees when compared to the left femur. Then two Hydroxyappatite (HA)-coated Shanz pins were inserted respectively at the lateral part of the femur proximally and distally. The placement of the Shanz pins was made slightly near to the anterior cortex and perpendicular to the anatomical axis of the femur penetrating two cortices in order to allow subsequent passage of the nail. This was followed by femoral osteotomy which was performed at the diaphyseal and metaphyseal junction which was about 10 cm from the knee joint. The osteotomy itself was performed using a semi-circumferential bone drilling technique with a 3.5-mm drill bit on the lateral, posterior and anterior part of the cortex and completed by osteotomizing the medial cortex using an osteotome.

The valgus deformity of the right femur created two different anatomical axes proximal and distal to the deformity site. These two axes intersected at a crossing point known as Centre of Rotational axis or CORA. This point was located 10 cm proximal to the joint line and the osteotomy of the femur was performed at this point. We placed the shantz pins perpendicular to these two anatomical axes and once the osteotomy was completed, we were able to correct the valgus deformity of the distal femur by distracting the osteotomy site like an open wedge method and making sure that the shantz pins were parallel to each other proximally and distally. This can be seen from Figures 1B and 1C where osteotomy is done at the CORA and valgus deformity was corrected. This was followed by stabilizing the position of the pins with a monorail bar so that the correction of the valgus was maintained.

The retrograde nail was introduced subsequently and the reaming of the canal was continued until size 11 and nail size 10 was introduced into the canal. The nail was locked at the distal part of the femur and the proximal part was not locked in order to allow the lengthening process to work. This can be seen from Figure 1A where the nail has been inserted and monorail inserted in situ. Post operatively, the patient was started with iv cefuroxime 1.5 gm 8 hourly during hospitalization. Intraoperative flexion was able to be achieved up to 90 degrees. Post operatively pain was controlled. Patient was allowed to go home on day 3 post operatively and was seen back at the clinic 10 days after discharge. During the time the patient was instructed not to distract the external fixator. During this latency period, the patient was only allowed to do daily wound dressing and no other complications were noted.

After fourteen days, the patient was instructed to distract the LRS 1 mm per day (0.25 mm every 6 hours). He was seen every 2 weeks to check for any complications that may arise. However, after two weeks, it was noted that the patient was unable to distract the LRS anymore. The difficulty was due to the inability to move the nail during the lengthening process because it was tightly inserted into the canal. As a result, we had to remove the nail temporarily to overcome the tightness and to allow the lengthening process to work. Hence the removal of nail was performed on day 28 post-operatively in which the patient was again instructed not to distract the LRS system and to start distracting 10 days after that. The distraction process worked well after day 10 and continued up to day 35. It was stopped on day 35 once the required amount of lengthening had been achieved. Once the length was achieved, the retrograde nail was inserted again and it was locked both distally and proximally before the LRS frame was removed. The patient was then instructed to ambulate with crutches while waiting for the consolidation process to complete. The range of motion exercises was started for the knee joints. Figure 2 shows post removal of the monorail external fixator and the lengthened femur shows callus formation all over the cortices indicating good bone union. Figures 3A and 3B show intraoperative and postoperative pictures regarding the advantage

of this technique whereby there was no restriction of joint mobility towards the knee. In figure 3C the joint orientation angle is important as we also corrected the valgus deformity that this patient had, hence restoring patient anatomical lateral distal femoral angle which was reduced preoperatively compared to the normal side. Thus apart from lengthening we also used this technique to correct the anatomical axis of the femur.

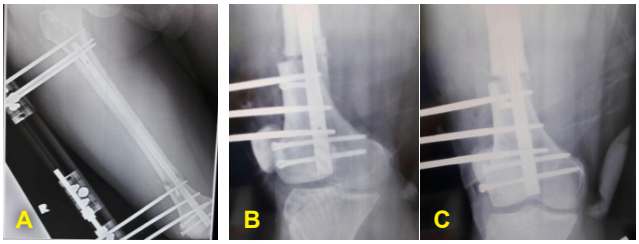


Figure 1. *A) Post-operative x-ray anterior posterior (AP) view showing correction of valgus deformity using LRS monorail external fixator with subsequent lengthening of the bone on nail B) lateral view of distal femur showing the osteotomy site and correction of valgus deformity*

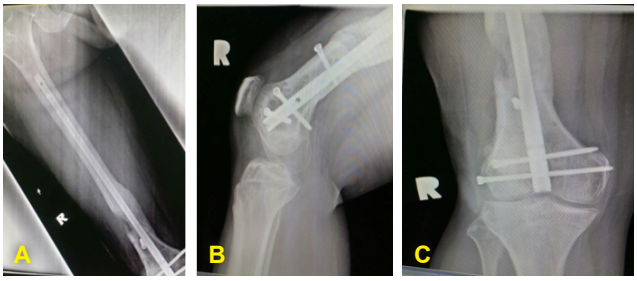
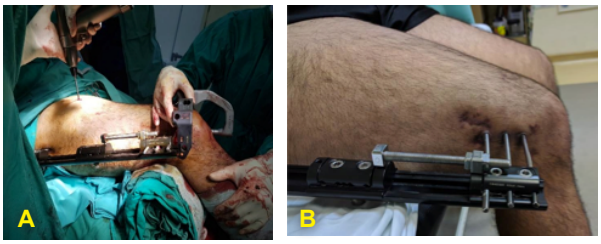


Figure 2. *Showing x-ray of the femur after completion of lengthening process A) AP view showing bridging callus more on medial side B) lateral view showing good anterior and posterior cortical union C) bridging callus over medial side of the femur*



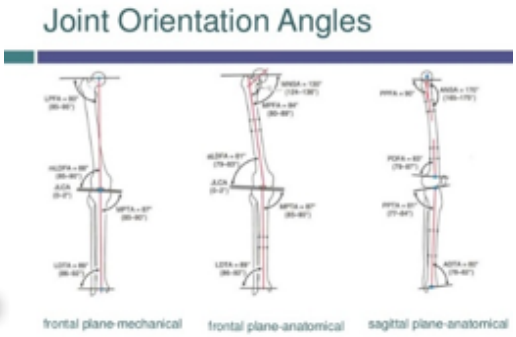


Figure 3. *A) intraop picture showing the locking of the proximal part of the nail with external fixator in situ B) post operative picture showing knee mobility C) showing diagram of joint orientation angles in which in this case the anatomical lateral distal femur angle was found to be less than 80 degrees making the distal femur in valgus position*

Discussion

Paley et al was the first one that introduced this method of lengthening of bone over the nail. [1] This method was introduced to fasten the healing and rehabilitation process of the patient. According to Paley *et al.* this method reduces the amount of time a patient needs to be on external fixator by one half. Apart from that, the radiographic consolidation index is also reduced significantly compared to the patient that is on Ilizarov method.

The standard method that is used for limb lengthening is the Ilizarov method. This method includes the use of rings and K wires to correct the deformity but the hardware needs to be kept for a long time during the consolidation phase and lengthening phase. This will put a psychological burden not only on patient but on the families as well. Apart from that the patient is also not encouraged for premature removal of the implant as it may lead to fracture and deformity.

In the Ilizarov method, the importance of preservation of endosteal blood supply is emphasized.[4] However, in this method reaming was done in order to insert the

nail which might jeopardize the endosteal blood supply. Patey *et al* in his study suggested to ream the canal at least 1.5 milimeters bigger than the intended size of the nail. According to his study, the reaming process does not prolong the time until the consolidation of new bone. This would mean that any damage to the medullary circulation during reaming is compensated by revascularization after reaming and the stability that is provided by the nail.[3]

There are many papers that support the advantage of bone lengthening using the intramedullary nail with an external fixator. In one study by Sun *et al.* in which they compared between bone lengthening of tibia using external fixator only and in combination with an intramedullary nail, they found out that the group that used external fixator with intramedullary nail produced better result with regard to bone healing time.[5]

Although there are many advantages of this technique it also comes with its own unique complication. In this case report there was one complication whereby the distraction was unable to proceed due to a tightly inserted nail. This may be due to the fact that initially we did not ream the canal 1.5 mm bigger than the intended size of the nail and that was why the nail was tightly inserted. However, after removal of the nail temporarily and reinsertion of the nail back into the femur after the canal was reamed up to 1.5mm bigger than the size of the nail, we managed to lengthen it back with no complication afterwards.

Conclusion

In this case report, the use of external fixator with intramedullary nailing to lengthen the femur is one method that can reduce the patient's burden mentally and physically. The long duration of time that is needed for the bone to lengthen and consolidate may jeopardize the knee mobility especially in a young active patient. Hence the use of this method will shorten the time and the patient can start performing joint exercises soon after removal of the external fixator while waiting for the bone to consolidate. However although it has many advantages we must watch out for the complication at regular visit so that a good outcome can be produced. A compliant patient is also needed so that patient will adhere to the instructions given by the doctor and physiotherapist.

REFERENCES

1. Gross RH. Leg length discrepancy, how much is too much? Orthop 1978; 1: 307-310a.
2. Song HR, Oh CW, Mattoo R, Park BC, Kim SJ, Park IH, et al. Femoral lengthening over an intramedullary nail using the external fixator: risk of infection and knee problems in 22 patients with a follow-up of 2 years or more. Acta Orthop 2005; 76(2): 245–52.
3. Paley D, Herzenberg JE, Paremain G, Bhave A. Femoral lengthening over an intramedullary nail. A matched-case comparison with Ilizarov femoral lengthening. J Bone Jt Surg Am 1997; 79(10): 1464–80.
4. Ilizarov G A. Clinical application of tension stress effect for limb lengthening. Clin Orthop 1990; 250: 8-26.
5. Sun XT, Easwar TR, Manesh S, Ryu JH, Song SH, Kim SJ, et al. Complications and outcome of tibial lengthening using thellizarov method with or without a supplementary intramedullary nail: a case-matched comparative study. J Bone Jt Surg Br 2011; 93(6): 782–7.

Surgical management of a mangled foot by a free vascularized fibular graft: A case report

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Abstract

The human foot serves as an important part to support the body weight and accounts for the majority of our movements. A mangled limb involves injury to at least three out of four systems, namely the soft tissues, nerves, blood supply and bone. While amputation is indicated in some cases of mangled limb, with proper planning, limb salvaging surgical management is also a viable option. Special consideration to the skeletal stabilization, control of infection, vascular status and soft tissue coverage is paramount to the success of limb salvaging surgery. We present a case of mangled limb which was successfully treated with limb salvaging surgical management. Initial debridement, Kirschner wires insertion and cross ankle external fixation were used for skeletal stabilization. An antibiotic spacer was inserted for local antibiotic and to maintain the length left due to the loss of medial and intermediate cuneiform bones. The anterior tibialis artery and its venae comitantes were utilized for free vascularized fibular graft to provide bony reconstruction as well as soft tissue coverage for the mangled foot.

IeJSME 2018 12(2): 30-33

Introduction

Since humans evolutionally adapt to a bipedal gait, the foot is important to allow humans to stand up, walk, run, and to jump.[1] Without the soft tissues and bones at the foot and ankle, our lower limbs cannot support the weight of the body.[1] A mangled limb is a consequence of high energy trauma leading to combined bone and soft tissue loss or destruction.[2] A mangled limb is defined as a lower limb with an injury to at least three out of four systems, namely the soft tissues, nerves, blood supply and bone.[3] In treating a mangled limb, the dilemma for the treating surgeons includes whether to amputate or to attempt a reconstruction. There are multiple scoring systems such as the Limb Salvage Index (LSI), the Predictive Salvage Index (PSI), Nerve injury, ischemia, soft tissue/injury, skeletal injury shock and age of patient score (NISSSA), Hannover Fracture Scale-97 (HFS-97) and Mangled Extremity Severity Score (MESS) which guide the treating surgeons in making a decision whether to amputate the injured lower extremity. However, it should not be considered as a strict rule and each patient should be assessed carefully and have an individualized approach to treatment. Multiple reports exist to remind us that limb salvaging management is a viable option.[2] Special consideration to the skeletal stabilization, control of infection, vascular status and soft tissue coverage is paramount to the success of limb salvaging surgery. We present a case of a mangled foot which was successfully treated with limb salvaging surgical management by following these principles.

Case Report

Mr IZ, a 40-year-old gentleman with no underlying medical illness, was involved in a high impact motor-vehicle accident. His left foot was trapped between the car and the road divider, requiring extrication by the emergency services. He sustained a mangled left lower limb with a 10 cm x 10 cm degloving wound at the dorsal aspect, extending from the ankle to the metatarso-phalangeal joint, exposing all the tarsal and metatarsal bones. The dorsalis pedis pulse was not palpable but the posterior tibial pulse was felt. The capillary refill time of all toes was approximately 2 seconds. The sensation over the dorsum of the foot was lost with intact plantar sensation. There was no other associated injury. Plain radiographs of the left foot showed fractures of all five metatarsal bones with tarso-metatarsal joint dislocations of the first and second toes, associated with medial and intermediate cuneiform bone loss (Figure A). In the emergency department, there was an episode of transient hypotension which resolved after fluid resuscitation. His calculated MESS was 6 (MESS score of 7 or more is highly predictive of lower limb amputation).

During the initial wound debridement, the irreparable dorsalis pedis artery was ligated. The ruptured extensor digitorum longus and extensor hallucis brevis were repaired. All the fractured metatarsal bones were fixed

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with Kirschner wires and antibiotic cement spacer was inserted to fill the gap caused by the loss of medial and intermediate cuneiform bones. A cross-ankle external fixation was done to stabilize the ankle and foot (Figure B). He underwent a series of wound debridement and 3 cycles of negative-pressure wound therapy (NPWT) to prepare the wound bed. A definitive reconstruction and wound closure was carried out on day 29 of admission using a free osteocutaneous fibular flap. An 8.5 cm fibular bone together with its overlying skin measuring 22 cm x 14 cm was raised from the contralateral leg based on the peroneal vessels to reconstruct the bony and soft tissue defects. The vascularized fibula was fixed to the navicular bone proximally and to the head of the first metatarsal bone distally with a one-third tubular plate. The skin paddle covered most of the soft tissue defect leaving only two small areas on the lateral and medial edges requiring split skin graft. The peroneal artery and its venae comitantes were anastomosed end-to-end with the anterior tibial artery and its venae comitantes respectively. Post-operatively, both the donor and recipient sites healed without complications. Both bony union and soft tissue recovery were achieved. A flap debulking surgery was subsequently performed to facilitate footwear fitting. The sensation was intact over the plantar aspect of the foot as well as the flap. He recovered well with good range of movement of the left ankle without any instability. He was able to return to work at six months post trauma. He was pleased with the outcome of the surgery.

Discussion

Management of a mangled extremity is difficult. With the advent of surgical techniques and technologies, comprehensive reconstructions are viable to salvage the extremity.[2] Attention should be given to skeletal stabilization, early soft tissue coverage, and control of infection.[3] Some authors practice immediate soft tissue coverage but in our case, we prepare the wound bed with NPWT prior to flap closure as described by Bakota et al in view of high risk of infected wound secondary to initial contamination.[2]

In order to salvage and reconstruct the foot of this patient, we needed to solve two technically demanding problems, namely soft tissue coverage and bony reconstruction. From the aspect of soft tissue coverage, limited amount of transferable soft tissue makes local and regional flaps impractical in this case.[1] The risk of flap congestion and restricted rotational reach make reverse sural artery flap a suboptimal choice as well. A large soft tissue defect of the foot can be covered with a free antero-lateral thigh flap and has been shown to have good outcomes.[1] In this case, the bony gap caused by the loss of medial and intermediate cuneiform bones as well as the proximal part of the first metatarsal bone requires a bone strut to stabilize the tarso-metatarsal joint. Autologous cortico-cancellous iliac bone graft has been described for the reconstruction of the first metatarsus in cases of tumour resection.[4] However, in cases of traumatic bone loss, the blood supply of the surrounding tissue can be highly unreliable to ensure success of such a graft. Hence, the treatment of choice is a free vascularized bone graft. The fibula flap is an extremely versatile flap where it can be raised with a large skin paddle as well as muscle if required. The structural similarity between the fibula and the metatarsal bone makes fibula an ideal choice for filling up the defect of the first metatarsus.[5] In this case, we use a longer fibular graft to occupy the large bone gap. The fibular osteocutaneous flap requires recipient artery and vein to anastomose for it to survive. Option of recipient artery in this mangled foot is limited as the foot is surviving on the posterior tibialis artery and its branches alone. Any attempt to channel the blood supply from the posterior tibialis to the flap will lead to gangrene of the foot as the irreparable dorsalis pedis artery had been ligated. We harvested a larger fibular osteocutaneous flap with the peroneal artery and its venae comitantes to anastomose end-to-end with the anterior tibial artery and its venae comitantes, proximal to the ligated dorsalis pedis site.

REFERENCES

1. Liu L, Cao X, Zou L, Li Z, Cao X, Cai J. Extended Anterolateral Thigh Flaps for Reconstruction of Extensive Defects of the Foot and Ankle. PLoS ONE 2013; 8(12): e83696. doi:10.1371/journal.pone.0083696
2. Bakota B, Kopljar M, Jurjevic Z, Staresinic M, Cvjetko I, Dobric I, Faoite DD. Mangled Extremity – Case Report, Literature Review and Borderline Cases Guidelines Proposal. Coll Antropol 2012; 36(4): 1419-26.
3. Hallock GG. The mangled foot and ankle: soft tissue salvage techniques. Clin Podiatr Med Surg. 2014; 31(4): 565-76.
4. Merter A, Armangil M, Kaya B, Bilgin S. Immediate emergency free anterolateral thigh flap after car-tyre friction injury: A case report with eight years follow-up. Internat J Surgy Case Rep 2017; 38:102-6.
5. Hilaire HS, Steele TN, Delatte S, Hebert CK, Canizares O. Metatarsal Reconstruction with a Fibular Osteocutaneous Flap: A Novel Approach Utilizing Virtual Surgical Planning. Plast Reconstr Surg Glob Open 2014; 2e258; doi: 10.1097/GOX.0000000000000223

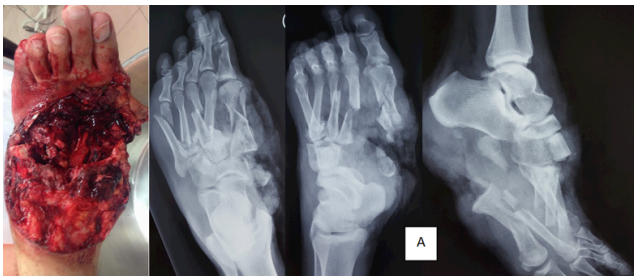

Figure A shows the initial appearance of the left foot post-trauma with the associated plain radiographs in antero-posterior, oblique and lateral views respectively (from left to right).

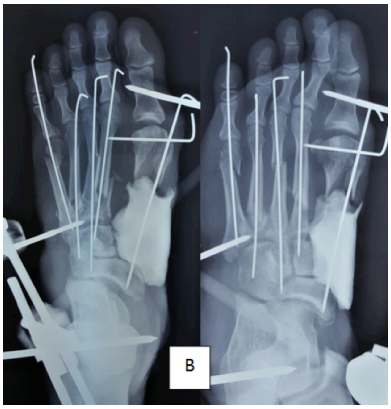

Figure B shows the plain radiographs (antero-posterior and oblique views) after wound debridement, Kirschner wires insertion, antibiotic cement spacer insertion and cross-ankle external fixation.

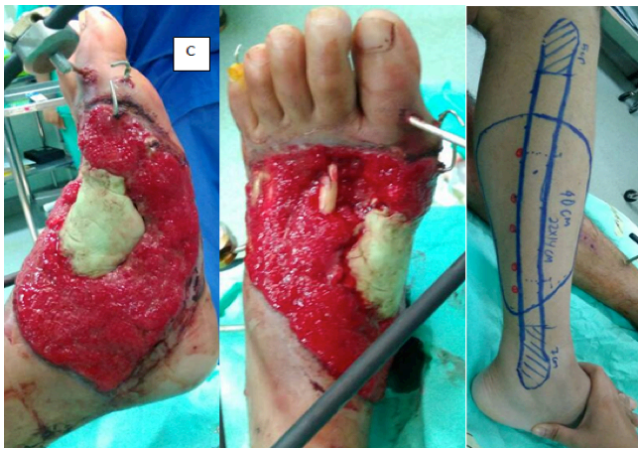

Figure C shows the appearance of the wound at his left foot after multiple cycles of vacuum-assisted closure therapy and the planned donor site for osteocutaneous fibular flap at the contralateral leg.

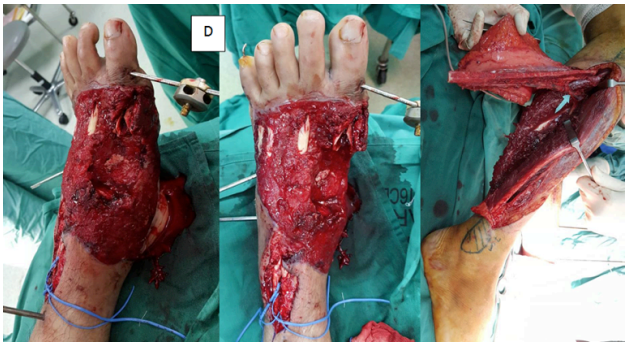

Figure D shows the appearance of the wound after debridement and removal of the antibiotic cement. The osteocutaneous fibular flap is raised from the contralateral leg based on the peroneal vessels (green arrow) to reconstruct the bony and soft tissue defects.

Figure F shows both bony union and soft tissue recovery of the left foot. The flap is of acceptable size for shoe fitting after a debulking surgery. Multiple vascular clips are used for ligation of the irreparable dorsalis pedis artery.

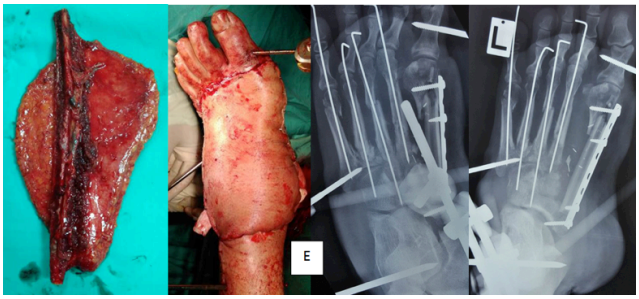

Figure E shows the harvested osteocutaneous fibular flap used for reconstruction of the left foot. The fibular graft was anchored to the navicular bone proximally and to the head of the first metatarsal bone distally with a one-third tubular plate.

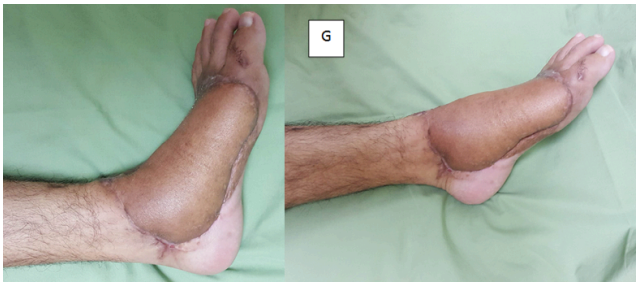

Figure G shows the range of movement of his left ankle in full dorsiflexion (left) and plantar flexion (right).

Bone transport using semicircular Ilizarov ring fixator in the treatment of the infected nonunion of the humerus: A case report

Kamarul Izham bin Kamarudin, Jun Wei Then, Ching Wooi Yeoh, Ying Jing Ooi, Chopra S

Abstract

Bone transport using the Ilizarov technique has been one of the most popular techniques in treating fracture with significant bone defect. However, pain and joint stiffness following Ilizarov fixation are few of the well-known complications. We report a case of a 23-year-old gentleman with a closed left humeral diaphyseal fracture following a traffic accident who underwent plating of the left humerus which was later complicated with infected nonunion. He was then treated with corticotomy and bone lengthening using the semicircular Ilizarov ring fixator. Good clinical and functional outcomes were observed during transportation period (elbow flexion 10° to 90°) with minimal complications.

IeJSME 2018 12(2): 34-36

Keywords: Semi-circular Ilizarov rings, infected nonunion, bone transport

Introduction

Septic non-union is a relatively common complication encountered in our day-to-day practice as an orthopaedic surgeon. Achieving union in septic nonunion with multiple previous surgeries remained a major challenge. Bone transport using the Ilizarov technique is a well-established and widely accepted method in treating fractures with significant bone defects.[1-4] This technique is preferred and thought to be more superior over others owing to its peculiar entities, especially the use of percutaneous transosseous wiring which significantly reduces the intraoperative and postoperative complications, predominantly the risk of soft tissue and neurovascular injury as well as pin site infection. However, the use of the traditional full ring Ilizarov system due to its increased stability has been associated with multiple debilitating complications including bulky and heavy apparatus, pain and discomfort, as well as joint stiffness[5] that further limits its wide application especially in the case of upper limbs.

Case Report

A 23-year-old gentleman was presented to us following a traffic accident complaining of pain and swelling over the left arm. He was diagnosed with closed fracture of left mid shaft humerus and initially underwent open reduction and internal fixation with plating, complicated with infection and subsequently developed nonunion. He presented to us 9 months post internal fixation with nonunion of the left humerus. Laboratory and radiological investigations revealed active infection with signs of chronic osteomyelitis. Removal of implant, sequestrectomy and external fixation of the left humerus was done subsequently, with implant loosening, presence of biofilm, slough tissues and seropurulent discharge noted intraoperatively. Four cm of infected devitalized bones resected. Multiple courses of parenteral and oral antibiotics were given until the infection settled completely, evidenced clinically as well as biochemically.

The nonunion of the left humerus was ultimately treated with bone transport by using semicircular Ilizarov ring fixator. The fibrous scar tissues were removed and both proximal and distal rounded bone ends were refreshened until healthy bleeding bones exposed. Medullary canals over both ends were opened. Three Shanz pins were inserted into the proximal fragment, 2 Shanz pins were inserted into the transport fragment while 1 Shanz pin and a 1.5mm K-wire were inserted into the distal fragment. Four semicircular rings were attached. A total of 30mm bone gap was left for transport. Corticotomy was done over the distal metaphyseal-diaphyseal junction of the left humerus. Bone transport was started on day 14 post fixation at the rate of 1mm/day (0.25mm QID) for a total of 50 days until docking of the fracture ends achieved. Active range of motion exercise was started on the immediate postoperative day and was maintained throughout the transportation period.

Distraction osteogenesis of 30 mm was successfully achieved within a period of 50 days. Good callus consolidation over the callotaxis portion of the bone

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was observed over the follow up period of 6 months. Throughout the transportation period no calcium, vitamin D supplements or other bone forming agents was given. Mild superficial pin tract infection was noted over 2 pins but not complicated with pin/wire loosening and resolved following a combination of antibiotics (Tab cefuroxime 250mg BD for 1 week) and dressings. Satisfactory range of motion of the elbow was observed (10 - 90 degrees of flexion) during every subsequent follow up. No other complications such as radial nerve palsy or callus fracture occurred.

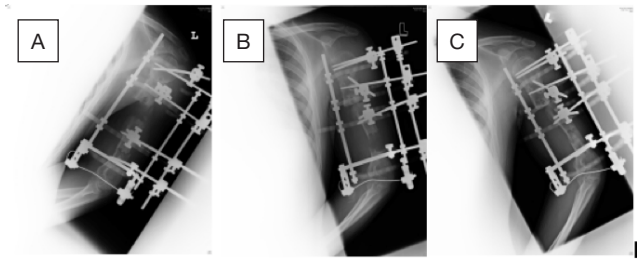

Figure 1: plain radiographs of left humerus at (A) 0 month, (B) 3 months and (C) 6 months follow up; showing radiological evidence of good callus formation and consolidation over callotaxis site

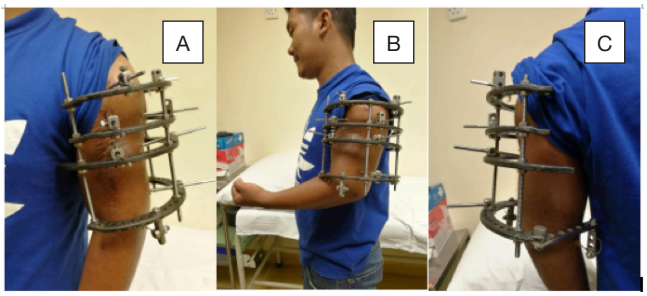

Figure 2: (A) anterior view, (B) lateral view, (C) posterior view of patient with semicircular Ilizarov ring fixator in situ with elbow flexed to 90 degrees

Discussion

Ilizarov has been a very successful and widely accepted technique in treating nonunion of humerus. It offers stable construction via minimally invasive procedures with minor discomfort without compromising the blood supply and osteogenic tissues, apart from being relatively safe with no major complications.[6] The application of Ilizarov provides numerous advantages including its feasibility in infective cases, allows postoperative 3-dimentional correction of deformities and early mobilization of fractured limbs.[7] Multiple studies have shown its success in humeral lengthening from 8-16 cm without significant complications.[7-9] However its benefits and usage are limited by various complications mainly due to the bulkiness of the fixator, persistent pain and discomfort, pin tracts infection and prolonged joint immobilization.

Various literatures have demonstrated excellent results with the introduction of the semicircular ring fixators as the substitution of full ring fixators in other regions of the body especially in femur and tibia.[10,14,15] However little has been mentioned regarding its efficacy in treating upper limb fractures. The implementation of the semicircular ring fixation in our case has shown to yield comparable results while being able to minimize the potential complications seen with conventional full ring Ilizarov fixation. The choice of semicircular ring fixation did not demonstrate any compromise or inferiority in terms of stability of the construct as compared to the full ring fixation. In turn it appeared to be more user friendly and easily assembled and therefore warranted a shorter operation time. Patient's self satisfaction level and compliance to the fixator also markedly improved owing to the less bulky apparatus and potentially the absence of impingement of the frame against the lateral chest wall unlike those invariably seen in full ring fixator, hence less pain and discomfort.

Multiple previous studies had revealed that the commonest complications - pin tract infection and joint stiffness were invariably present following the

application of ring fixators with the incidence of approximately 10%, respectively.[7,10-13] Pin tract infection as an inevitable complication has also been observed in our patient during the transportation period but it was easily manageable with little intervention and no residual complication. The range of motion of the affected elbow was also able to be maintained at an acceptable and satisfactory range. On the other hand, other complications such as recurrence/persistence infection, failure of distraction osteogenesis, premature callus consolidation and neurovascular injury were not encountered.

We concluded that bone transport in humerus using the semicircular Ilizarov ring fixator is an equally effective method and is able to produce excellent results whilst eliminating the undesirable bulkiness and discomfort potentially caused by full ring fixator.

REFERENCES

1. Rigal S, Merloz, P, Nen D L, Mathevon H, Masquelet A. Bone transport techniques in posttraumatic bone defects. Orthop Trauma Surg Res, 2012; 98: 103-8. doi:10.1016/j.otsr.2011.11.002
2. Paley D, Maar, D. Ilizarov Bone Transport Treatment for Tibial Defects. J Orthop Trauma 2000; 14: 76-85.
3. Yin P, Zhang Q, Mao Z, Li T, Zhang T, Tang P. The treatment of infected tibial nonunion by bone transport using the Ilizarov external fixator and a systematic review of infected tibial nonunion treated by Ilizarov methods. Acta Orthop. Belg 2014; 80, 426-35.
4. Bobroff GD, Gold S, Zinar D. Ten Year Experience with Use of Ilizarov Bone Transport for Tibial Defects. Bull Hosp Jt Dis. 2003; 61: 101-7.
5. Lakhani A, Singh D, Singh R. Outcome of rail fixator system in reconstructing bone gap. Indian J Orthop 2014; 48: 612–6. http://doi.org/10.4103/0019-5413.144237
6. Sioros VS, Lykissas MG, Pafilas D, Koulouvaris P, Mavrodontidis AN. Ilizarov treatment of humeral shaft nonunion in an antiepileptic drug patient with uncontrolled generalized tonic-clonic seizure activity. J Orthop Surg Res 2010; 5: 48. http://doi.org/10.1186/1749-799X-5-48
7. Kiran M, Jee R. Ilizarov's method for treatment of nonunion of diaphyseal fractures of the humerus. Indian J Orthop 2010; 44:444–7. http://doi.org/10.4103/0019-5413.69319
8. Cattaneo R, Catagni MA, Guerreschi F. Applications of the Ilizarov method in the humerus. Lengthenings and nonunions. Hand Clin. 1993; 9: 729-39.
9. Cattaneo R, Villa A, Catagni M, Tentori L, Cassi M. [Application of the Ilizarov technic in the lengthening of the humerus]. Rev Chir Orthop Reparatrice Appar Mot. 1986; 72: 203-9.
10. Lammens J, Bauduin G, Driesen R, Moens P, Stuyck J, De Smet L, et al. Treatment of non union of humerus using Ilizarov external fixator. Clin Orthop Relat Res. 1998; 353: 223–30.
11. Maini L, Chadha M, Vishwanath J, Kapoor S, Mehtani A, Dhaon BK. The Ilizarov method in infected non union of fractures. Injury 2000; 31: 509–17.
12. Patel VR, Menon DK, Pool RD, Simonis RB. Nonunion of humerus after failure of surgical treatment- management using Ilizarov external fixator. J Bone Joint Surg Br. 2000; 82: 977–83.
13. Iacobellis C, Berizzi A, Aldegheri R. Bone transport using the Ilizarov method: a review of complications in 100 consecutive cases, Strateg Trauma Limb Recon 2010; 5: 17-22, DOI: 10.1007/s11751-010-0085-9
14. Krishnan A, Pamecha C, Patwaet JJ. Modified Ilizarov technique for infected nonunion of the femur: the principle of distraction-compression osteogenesis. J Orthop Surg 2006; 13: 265-72.
15. Ashraf A. Khanfour, Mohamed M. El-Sayed. Efficacy of a compliant semicircular Ilizarov pin fixator module for treating infected nonunion of the femoral diaphysis. Strat Traum Limb Recon 2014; 9: 101–9. DOI 10.1007/s11751-014-0199-6