

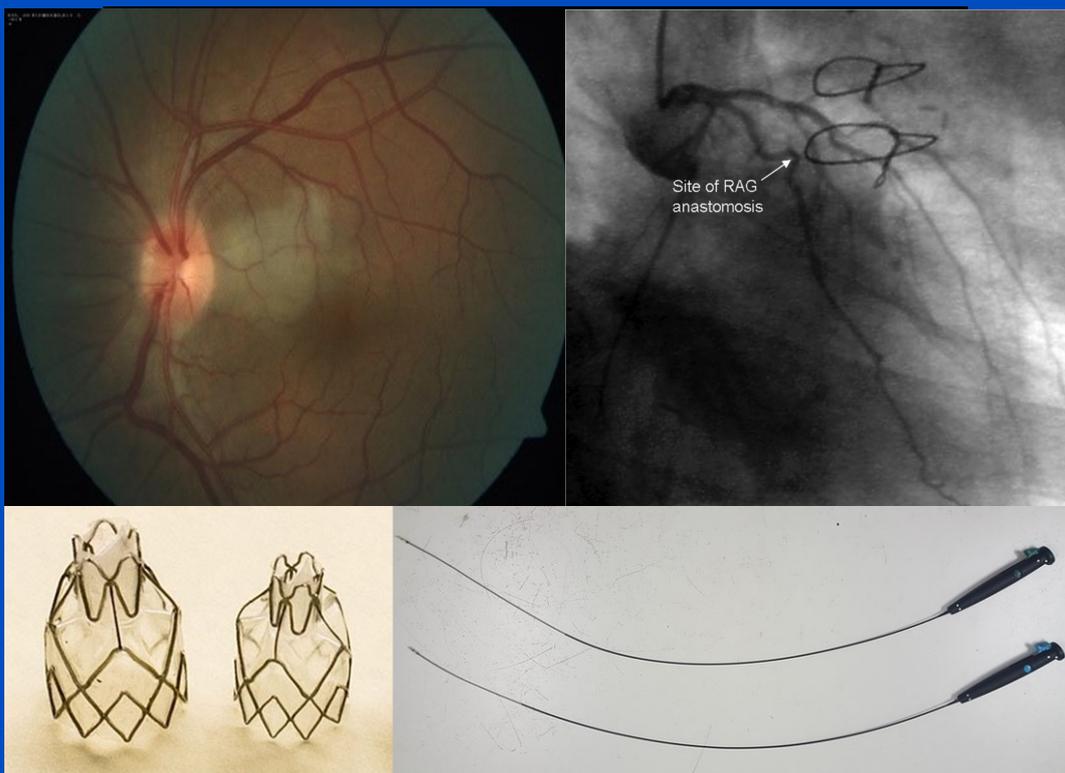


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Review of the implementation of Brunei Darussalam's New Mental Health Order in a psychiatric ward in RIPAS Hospital.

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ABSTRACT

Introduction The Brunei Darussalam New Mental Health Order was implemented on 1st November 2014, replacing the 1929 Lunacy Act. The aim of this study was to evaluate the implications of the new Mental Health Order on admissions to the psychiatric ward in Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital in the first year of implementation. **Method** All new psychiatric in-patient admissions and readmissions between 1st November 2014 and 31st October 2015 were included in the study. Each new admission or readmission was regarded as a "case". Admission, demographic, diagnostic data and length of stay were collected from the ward admission register, hospital electronic records and completed involuntary treatment forms. Comparisons were made between voluntary and involuntary "cases". **Results** One hundred and fifty-eight patients were included in the study. There were 179 cases in total, of which 21(11.7%) were readmissions for 15 patients. 105 (58.7%) cases were involuntary and 74 (41.3%) were voluntary. There were higher proportions of schizophrenia, acute and transient psychotic disorder, schizoaffective disorder and primary diagnosis of mental and behavioural disorder due to psychoactive substance abuse in the involuntary group. The mean length of admission was 26.11 (sd= 29.69, range = 1 - 170) days for all cases, 28.24 (sd = 31.41, range = 1-170) days for involuntary cases and 23.09 (sd = 26.97, range = 1-156) days for voluntary cases. Long term (six month) involuntary treatment orders were used only for 16 (6.1%) of cases. **Conclusions** Involuntary admissions make up the majority of admissions for patients admitted with a diagnosis of mental disorder. Those presenting with a psychotic disorder or substance abuse disorder were more likely to be involuntarily admitted. Long-term involuntary treatment orders were not commonly used.

Keywords: Involuntary Admission, Involuntary Treatment, Mental Health Services, Mental Health Legislation

INTRODUCTION

Brunei Darussalam is a small country (population 406,000) in Southeast Asia, which scores highly in economic, health and

social indicators.¹ Mental health care services have undergone a period of expansion and development.² The new Mental Health Order was implemented on 1st November 2014, replacing the 1929 Lunacy Act.³ The development and contents of this legislation have

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been described elsewhere.⁴ The new legislation was drafted to replace the previously inefficient system for involuntary detention and a growing awareness of the need to improve protection for mentally disordered people. Strengthening governance in mental health care and developing a national law to protect the rights of people with mental disorders is a key objective of the World Health Organization's Mental Health Action Plan 2013 – 2020 which was endorsed by Brunei at the 66th World Health Assembly.⁵ The previous Lunacy Act did not acknowledge the patient's right to make decisions about his own care and did not require a medical recommendation for involuntary treatment. Medical practitioners could not initiate involuntary treatment but had to direct relatives to the Magistrate's Court to apply for an order under the Lunacy Act. This was an inefficient system which did not safeguard the treatment or welfare of mentally disordered people. It was difficult to identify involuntary or voluntary in-patients as the documentation was often poorly recorded. There were no statutory review requirements. With the new legislation, the responsibility for making decisions regarding involuntary treatment has been shifted from the Magistrate's Court to the examining medical practitioner and a Board of Visitors.

"Voluntary" and "involuntary" admissions

A voluntary admission into a psychiatric facility occurs when the person consents to their admission and is assessed as having the capacity to give informed consent. An involuntary admission occurs in two ways. Under Section 8(1), an involuntary admission occurs when a person who is suspected to be suffering from a mental disorder is admitted upon application by a relative or carer and a recommendation by a medical practitioner that *"he is suffering from a mental disorder of a nature or degree which warrants his admission into a psychiatric facility for the purposes of assessment or treatment; or he ought to*

be detained in the interest of his health or safety or for the protection of other persons". Involuntary admission under Section 12(1) occurs when any suspected mentally disordered person sent to a psychiatric facility by the police or a medical social worker for examination by a designated medical practitioner is found to be *"suffering from a mental disorder and in need of care and treatment"*.

Involuntary admissions start with a 72 hour assessment that may progress to a one month treatment order. Thereafter, a treatment order for six months can be used. This is renewable for up to one year by the Board of Visitors, an independent review body tasked to review psychiatric facilities. Upon discharge, patients can be placed under a community treatment order for up to two years. There are three levels of appeal against involuntary treatment. Practical guidance and application forms are published in the Code of Practice.⁶

Preparation for implementation

The proper implementation of new legislation requires much preparation. The pre-implementation plan included national roadshows and training sessions for key stakeholders such as the police, prison officers, the Courts, welfare agencies, village heads, community groups, school counsellors, nurses and allied health professionals. Information was released through radio, television, newspapers and the distribution of information leaflets. This was found to be a good opportunity to educate the public about mental health and the services available. 501 (85%) of the 590 registered medical practitioners and 11 (85%) of the 13 medical social workers in the country received a half-day training session. More in-depth training was provided to health professionals working in psychiatric facilities. An administrator was appointed to oversee the processes involved and to ensure adequate data collection for audit.

There were concerns that it would be "easier" for medical practitioners to detain more people for longer periods, and that the police would bring large numbers of people to hospital for detention. Medical social workers wondered if they would be inundated with requests to apprehend people in the community. In order to manage these concerns, multi-agency protocols were agreed and distributed. Liaison work was done with agencies such as the police, public prosecutors and the Courts.

Challenges in practice

Brunei did not have a history of modern mental health law. This task required the introduction of new concepts and processes into the mental healthcare system and wider society. It required willingness from health professionals and stakeholders to adapt and take responsibility for its use. The use of standardised forms and protocols required careful attention to details such as the use of different section numbers, review requirements and dates of expiry.

AIMS AND OBJECTIVES

This study aims to evaluate the implications of the new Mental Health Order on admissions to the psychiatric ward in Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital in the first year of implementation. The experience of implementing the new legislation is also described, with suggestions for future improvement.

METHOD

Patients and Study setting

RIPAS hospital is the national tertiary medical centre with the largest psychiatric admission ward in the country with a catchment area covering more than three-quarters of the population. The ward is a 20 bed mixed gender facility that provides acute in-patient psychiatric treatment for patients aged 14 years and above. All psychiatric in-patients admitted between 1st November 2014 and 31st October 2015 were included in the study. This

study was conducted as part of our departmental audit.

Inclusion criteria

All admissions during the study period above were included. The length of admission was calculated as the number of days stayed in the ward, from the date of admission until the date of discharge, or until 31st October 2015 if the patient was still an in-patient. An admission was defined as "involuntary" if the person was involuntarily admitted or treated in hospital at any point during their stay. Multiple admissions for the same person were recorded as separate admissions. As we were interested in the characteristics of each admission in its own right, every readmission was regarded as a separate "case" and comparisons were made between voluntary and involuntary "cases".

Exclusion criteria

A small number of patients admitted voluntarily for elective maintenance electroconvulsive therapy were excluded. Patients who were admitted into hospital for assessment of fitness to stand trial were also excluded. These patients are detained under separate legislation for the management of mentally disordered offenders.⁷

Data collection

Admission and demographic data were routinely collected for all in-patients from the ward admissions register and Bru-HIMS (Brunei Health Information Management System), which is the hospital's electronic patient records system. Diagnostic data was obtained from the recorded ICD-10 diagnosis and checked with the patients' written electronic case-notes. Completed mental health order forms are routinely recorded and filed. The data for this study were obtained from these existing sources.

Quality of paperwork

A sample of used Mental Health Order forms

was selected to examine the quality of completed paperwork during the study period.

Statistical analyses

Data were entered into a database using the Statistical Package for Social Sciences, version 16.0. Continuous data were presented as mean (SD) and analysed using Student t-test. Categorical data were analysed using Pearson's Chi-Squared test. $p < 0.05$ was taken as statistical significance. Demographic data were presented for the study sample, whilst diagnostic and admission data were compared between voluntary and involuntary "cases".

RESULTS

Sample size and number of "cases"

One hundred and fifty-eight patients were included in the study. There were 179 cases in total, of which 21(11.7%) were readmissions for 15 patients.

Patient demographics

One hundred and eight (68.4%) patients were male and 50 (31.6%) patients were female. Of the involuntary patients, 66 (68.0%) were male and 31 (32.0%) were female. Of the voluntary patients, 42(68.9%) were male and 19(31.1%) were female. The mean age at admission was 37.2 years (sd=11.84) for the whole sample, 36.45 years (sd=11.78) for involuntary patients and 38.59 (sd=11.91) for voluntary patients. Comparison of means using Student's t-test found no significant difference in mean age between involuntary and voluntary patients, although involuntary patients tended to be slightly younger ($p = 0.272$, $t = -1.103$). Demo-

graphic data is demonstrated in Table 1 below.

Length of admission

The mean length of admission was 26.11 (sd= 29.69, range = 1 - 170) days for all cases, 28.24 (sd = 31.41, range = 1-170) days for involuntary cases and 23.09 (sd = 26.97, range = 1-156) days for voluntary cases. No statistical difference was found between involuntary and voluntary cases ($p=0.242$, $t=1.173$), however voluntary admissions tended to be shorter.

Diagnoses

Schizophrenia was the most common primary diagnosis recorded in cases, followed by bipolar disorder (Table 2). Mental and behavioural disorder due to substance abuse was the third most common diagnosis. The use of crystal methamphetamine, locally known as "syabu", was reported in all but one case with a substance abuse diagnosis. Pearson's chi-squared analyses showed statistically significant differences between voluntary and involuntary cases (Table 2). There were higher proportions of schizophrenia, acute and transient psychotic disorder, schizoaffective disorder and diagnosis of mental and behavioural disorder due to psychoactive substance abuse in involuntary cases compared with voluntary cases.

The use of involuntary treatment

Seventy-seven (43.0%) cases were admitted involuntarily through co-application by a medical practitioner and relative. Sixteen (8.9%) cases were involuntarily admitted after appre-

Table 1. Demographic data of patients admitted into RIPAS hospital psychiatric ward.

	Number (%), n=158 Total patients	Number (%), n=97 Involuntary pa- tients	Number (%), n=61 Voluntary pa- tients	p- and t-value
Males	108 (68.4%)	66 (68.0%)	42 (68.9%)	
Females	50 (31.6%)	31 (32.0%)	19 (31.1%)	
Mean Age on Admission	37.2 years (sd=11.84)	36.45 years (sd=11.78)	38.59 years (sd=11.91)	$p=0.272$, $t=-1.103$

Table 2. Diagnoses of cases admitted into RIPAS psychiatric ward.

Diagnosis	Total cases, n=179 (%)	Voluntary cases, n=74 (%)	Involuntary cases, n=105 (%)
Schizophrenia	69 (38.5%)	27 (36.5%)	42 (40.0%)
Bipolar affective disorder	35 (19.6%)	21 (28.4%)	14 (13.3%)
Mental and behavioural disorder due to psychoactive substance abuse	22 (12.3%)	5 (6.8%)	17 (16.2%)
Depressive episode	15 (8.4%)	10 (13.5%)	5 (4.8%)
Acute and transient psychotic disorders	12 (6.7%)	2 (2.7%)	10 (9.5%)
Schizoaffective disorder	8 (4.5%)	2 (2.7%)	6 (5.7%)
Mental retardation	4 (2.2%)	2 (2.7%)	2 (1.9%)
Personality disorder	3 (1.7%)	1 (1.4%)	2 (1.9%)
Anxiety disorders	2 (1.1%)	0	2 (1.9%)
Reaction to severe stress and adjustment disorders	2 (1.1%)	0	2 (1.9%)
Delusional disorder	1 (0.6%)	0	1 (1.0%)
No recorded ICD-10 mental disorder diagnosis*	6 (3.4%)	4 (5.4%)	2 (1.9%)

*(4 "brought by the police for assessment"; 1 Z63.0 "marital conflict"; 1 Z03.2 "observation for suspected mental disorder")

Pearson's chi-square value = 22.161, df = 12, p = 0.036, 17 cells (65.4%) have expected count less than 5.

hension to hospital by the police or medical social worker. Most involuntarily admitted cases proceeded to be placed under one month treatment orders. Fourteen (7.8%) cases that had been initially admitted voluntarily were subsequently placed on one-month involuntary treatment orders (Table 3). Long term (six month) involuntary treatment orders were used only in 11 (6.1%) cases. Upon discharge from hospital, six patients were placed under a community treatment order.

Appeals

Only one appeal against detention was lodged. This appeal went through the first level of the appeal process and was declined. The patient was eventually discharged before the appeal was heard at the next level.

Quality of paperwork

Of the 93 recorded 72 hour involuntary admissions, 92 forms were copied to the department's administrator. Of these, 16 (17.4%) contained errors. These often led to similar

Table 3. Sections of the 2014 Mental Health Order used for involuntary treatment in RIPAS hospital psychiatric ward.

Type of detention	Total cases, n=179 (%)
Section 8(1) <u>Involuntary admission for up to 72 hours</u> : medical practitioner + family member application.	77 (43.0%)
Section 12(1) <u>Involuntary admission for up to 72 hours</u> : police / medical social worker apprehension to hospital under Section 9 and subsequent admission by a designated medical practitioner.	16 (8.9%)
Section 8(4) <u>Involuntary treatment for up to one month</u> : determined by a designated medical practitioner after detention under Section 8(1).	54 (30.2%)
Section 12(4) <u>Involuntary treatment for up to one month</u> : determined by a designated medical practitioner after detention under Section 12(1).	8 (4.5%)
Section 7(4) <u>Involuntary treatment for up to one month</u> : determined by a designated medical practitioner after voluntary admission and a subsequent request for discharge.	14 (7.8%)
Section 13(3b) <u>Involuntary treatment for up to six months</u> : determined by a designated medical practitioner and a psychiatrist before expiry of Section 8(4), 12(4) or 7(4). Renewable by the Board of Visitors.	11 (6.1%)
Section 32 <u>Community treatment for up to 2 years</u> upon discharge of an involuntary patient from a psychiatric facility: determined by a designated medical practitioner.	6 (3.6%)

errors filling in the subsequent one month involuntary treatment forms. When the medical practitioners affected were asked for feedback, there appeared to be confusion regarding the different sections of legislation to use and the design of the forms. Multiple errors were made by a small number of practitioners.

DISCUSSION

This study has found that adequate data on involuntary treatment is being kept in the country's main psychiatric facility. This is encouraging as it is vital to continuously evaluate the use of involuntary treatment. The length of admission was similar between involuntary and voluntary groups. Long-term involuntary treatment was not commonly used. Patients given involuntary treatment are not being held in hospital for significantly longer periods than voluntary patients. The majority of involuntary admissions were initiated by co-application between medical practitioners and a relative. Only a minority of admissions occurred through the apprehension powers of the police or medical social workers.

Although this study found statistically significant differences in diagnoses between voluntary and involuntary cases, these results should be viewed with caution as the numbers present in each group were small and often less than 5. There appeared to be an increased likelihood of those with acutely disturbed presentations such as acute psychosis or the effects of substance abuse, being admitted involuntarily. Involuntary patients also tended to be younger than voluntary patients. Although this study did not evaluate this specifically, these findings may reflect the increased likelihood of involuntary admissions to be first presentations of younger and more acutely disturbed patients. Older patients with a history of previous psychiatric treatment are arguably more likely to seek voluntary treatment due to having better insight and a pre-

existing therapeutic relationship with mental health staff. This study also found that a proportion of patients were readmitted within the 12-month period of the study, some being readmitted more than once. The factors related to these frequent readmissions may be related to diagnoses, severity of illness, insight, co-morbid substance abuse and social circumstances. These are factors that should be explored further in future studies.

This study found that mental and behavioural disorder due to substance abuse, specifically crystal methamphetamine, was a common diagnosis. Our findings are consistent with previous research that found crystal methamphetamine to be the apparent substance of choice in Brunei.⁸ The management of substance abuse and its overlap with the criminal justice system is an area that requires improvement. The use of illicit substances is an offence in Brunei which falls under the purview of the Narcotics Control Bureau.⁹ Those found guilty of drug related offences can be diverted to residential drug rehabilitation or community supervision programmes. However the processes involved are lengthy and lack the ability to respond to acute individual needs. This often results in an over-reliance on the psychiatric system, resulting in recurrent acute admissions.

Patients rarely exercised their right to appeal against involuntary treatment. This may reflect the culture where there is high compliance to authority and reluctance to challenge authority figures such as hospital staff. There are no advocacy or service-user organizations. Patients are not routinely informed of the procedures for appeal and there is no legal requirement for hospitals to display this information. Therefore there is little support available for patients, should they wish to appeal. It is hoped that patient-led services will develop with improved public and service-user awareness surrounding the implementation of the Mental Health Order. Community Treat-

ment Orders were not frequently used by clinicians. Many clinicians felt that this part of the legislation had little robustness. Other sections of the legislation not directly initiated by health professionals have not yet been used, for example court powers to order mental health assessments in civil cases regarding the management of assets, or investigations into neglect or abuse.

The introduction of the Mental Health Order has enabled the collection of data to monitor the use of involuntary treatment and to make comparisons between voluntary and involuntary treatment groups. Development in wider areas associated with patient welfare, advocacy and criminal justice systems, could further enhance the improvements initiated by the implementation of this new legislation.

Strengths and limitations

The strengths of this study include the examination of a complete cohort of in-patients affected by the new legislation. There were limitations to this study, which depended on the accuracy of records kept by clinical and administrative staff. Missing details were retrospectively sought, which could have affected the accuracy of data. The author was also involved in the drafting and implementation of the new law, which could have caused bias its evaluation. Nevertheless, it remains important to evaluate any change in practice. This study compared basic demographic and diagnostic variables between involuntary and voluntary admissions. Other factors which could have influenced the decision to use involuntary treatment such as age, mental state, insight, first presentation or previous mental disorder diagnosis, previous engagement with psychiatric services, social circumstances and risk of violence or self-harm, were not evaluated. These are areas that could be explored further in future studies. The use of a larger cohort of patients would allow more detailed statistical analyses.

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Radial Artery Grafts' String-Sign – Role of Graft Spasm and Competitive Flow.

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ABSTRACT

Introduction: Radial artery graft is prone to vasospasm and a small proportion developed string-sign. We investigated the role of vasospasm and competitive flow in radial artery graft string-sign. **Materials & Methods:** From May 1998 to April 1999, 101 patients (mean age of 59.5 ± 7.1 yr) recruited to the RSVP trial, underwent coronary angiography at 3.7 ± 1.1 months after CABG. **Result:** A total of 193 grafts (71 radial artery grafts; 122 saphenous vein grafts) were screened. All radial artery grafts were patent, compared with 96% of saphenous vein grafts. Five saphenous vein grafts (4%) were totally occluded and another 1.6% had anastomotic narrowing. Five radial artery grafts (7%) had diffuse string-sign and another 4 (6%) had anastomotic narrowing. Radial artery graft with string-sign had a mean diameter of 1.14 ± 0.25 mm. All responded to nitrate infusion significantly with a mean diameter of 1.38 ± 0.34 mm ($p=0.04$). These diameter changes were still significantly smaller than the mean diameter of normal radial artery grafts ($p<0.0001$). Retrospective analyses of preoperative angiograms confirmed presence of non-significant stenosis ($<70\%$) in 3 patients. **Conclusion:** Our findings indicated that competitive flow and diffuse graft vasospasm may contribute to the pathogenesis of radial artery graft string-sign.

Keywords: Radial artery, string-sign, competitive flow, vasospasm

INTRODUCTION

The term 'String-sign' was first used to describe diffuse narrowing of internal thoracic artery grafts (ITAG) to the left anterior descending (LAD) coronary arteries, with a reported incidences ranging from 2-11%.^(1, 2)

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ported incidences ranging from 2-11%.^{1, 2} It has since been reported in other arterial conduits used for coronary bypass surgery such as right gastroepiploic artery (RGEA), inferior epigastric artery (IEA) and more recently in the radial artery grafts (RAG).³⁻⁵ Reported incidence of this phenomenon in RAG ranges from 7-10%.⁶

Various explanations have been put forward for the cause of arterial grafts 'string-sign' such as damage during harvesting by electrocautery, inflammation in postcardiotomy syndrome or a steal phenomenon by larger branches of the ITAG but the most plausible of this is competitive flow from a non-significantly stenosed native coronary artery.⁽⁷⁾ The underlying mechanism is also uncertain but has been thought to be associated with diffuse graft spasm resulting from reduced flow state secondary to competitive flow from the native coronary artery.⁽⁷⁾ We assessed the significance of competitive flow by examining preoperative and postoperative angiograms in patients proven to have RAG 'string-sign' and tested the hypothesis that if the primary cause of 'string-sign' is indeed of diffuse graft spasm, then infusion of nitrates directly into the grafts during angiography should relieve the spasm and re-established complete patency and flow.

Materials and Methods

Patient population.

From May 1998 to April 1999, 142 patients undergoing myocardial revascularisation surgery at the Royal Brompton Hospital were recruited into our prospective randomized Radial artery versus Saphenous Vein Patency (RSVP) trial to compare angiographic patency rates of RAG with saphenous vein graft (SVG).⁸ Ethics approvals were obtained from the Royal Brompton Hospital Ethics Committee. Written informed consent was obtained from all patients preoperatively. Study design of the RSVP trial has previously been described.⁸ In brief, patients recruited were pre-operatively randomised to receiving either a RAG or SVG to the circumflex (Cx) artery. The internal thoracic artery (ITA) was grafted onto the LAD and all other territories (right coronary artery (RCA) and Diagonal (D)) were grafted using SVG or RAG if it was not randomised to the Cx artery, according to the surgeon's discretion. Early graft patency and

onto the LAD and all other territories (right coronary artery (RCA) and Diagonal (D)) were grafted using SVG or RAG if it was not randomised to the Cx artery, according to the surgeon's discretion. Early graft patency and physiological graft flow response data at 3 months after surgery, from the first consecutive 100 patients have recently been published.⁸

Surgical Technique

RA was harvested as described by Reyes *et al* at the same time as the ITA and long saphenous vein (LSV) using conventional sharp dissections and ligaclips.⁹ Both conduits were distended gently with heparinised whole blood (HWB) to physiological pressure (<200 mmHg), to check for leaks and to rinse the conduit free of clots. We have previously shown that distension to this physiological pressure does not adversely affect the vaso-reactivity of the RA conduit.^{8, 10} Both conduits were stored in HWB with Verapamil (1mg Verapamil/10mls HWB) until ready for grafting.

All proximal anastomoses were performed onto the ascending aorta with 6/0 prolene sutures. Distal anastomoses were made to the largest branch of the main circumflex (stenosis >70%), or a suitable intermediate or diagonal if the true circumflex was non dominant, with 7/0 prolene. Post-operatively all patients were started on a course of diltiazem 60mg tds for 6 weeks unless contra-indicated by hypotension or bradycardia.

Follow-up angiogram

Follow-up angiograms were performed in first consecutive 101 patients (99 Male; 2 Female) with a mean age of 59.5 ± 7.1 yr, at a mean of 3.7 ± 1.1 months after surgery to assess early RAG and SVG patency. Patients' demographics of all 101 patients are shown in table 1. There was no statistical significant

difference between the two groups. All cardiac medications and caffeine containing beverages were stopped for 24 hours prior to cardiac catheterisation. Five and 7 ch angiographic catheters and omnipaque contrast medium was used in all cases. Frames acquisition was set at 25F/sec. Heart rate and blood pressure were recorded through out the study.

Ethical approval was obtained from the Royal Brompton Hospital Ethics Committee to screen only grafts to the RCA and Cx (Study graft) arteries excluding the LAD in non-symptomatic patients. A total of 193 grafts, 101 (62 RAG; 39 SVG) grafted to Cx territory and 92 (9 RAG; 83 SVG) to RCA territory, were screened. As part of the protocol for the trial, 300 mg of nitrates were infused through any RAG with string-signs to rule out any graft spasm which may be present.

Primary endpoint was angiographic graft patency of both grafts. Graft diameter and degree of stenosis were assessed using quantitative coronary angiography (QCA, Medis NL) with site specified to proximal or distal anastomoses and body of graft. Analysis was performed by an independent investigator. Mean Diameter from perfectly patent RAG were used for comparison. Severity of preoperative target coronary artery lesions was analysed retrospectively in patients with RAG string-signs to investigate the significance of competitive flow.

Statistics.

Nominal data and patency rates between the two grafts were analysed using Chi square test (Microsoft excel, USA) for proportions. All pre and post-GTN RAG diameters were represented as mean ± SD and changes in diameter were analysed using paired student t-test (Microsoft excel, USA) with significance set at 5%.

Results

All RAG (100%) were patent with no incid-

Table 1: Patients' Demographics.

	RA (n=62)	LSV (n=39)
Mean Age (yr)	58.7 ± 6.3	59.4 ± 8.2
Sex (M/F)	61/1	38/1
CCS Angina Grading	2.0 ± 0.1	2.2 ± 0.2
NYHA Grading	1.3 ± 0.1	1.5 ± 0.1
Unstable Angina	32.8%	41.0%
Cardiac Risk Factors		
Diabetes	8.2%	20.5%
Hypertension	59.0%	51.3%
Smoking History	78.7%	71.8%
Hypercholesterolemia	77.1%	82.1%
Previous MI	49.2%	59.0%
Operative Details		
Mean Grafts/person	3.3 ± 0.1	3.3 ± 0.1
Mean Bypass Time	97.9 ± 3.0	96.0 ± 3.7
Mean X-Clamp Time	52.6 ± 2.1	50.5 ± 3.1
Post-Operative Data		
Intubation time		
(<3-12 hrs)	28	17
(<12-24 hrs)	30	17
(>24 hrs)	3	5
ICU Stay (hrs)	23.1 ± 1.9	26.9 ± 3.8
Blood Loss (ml)	907.4 ± 84.8	999.9 ± 153.6
Hospital Stay	6.8 ± 0.4	6.9 ± 0.4

Note: There are no significant differences between the two groups.

ence of complete occlusive disease as compared with 96% of SVG (5/122 SVG showed complete occlusion). There was no statistical significant difference between the two groups in terms of early angiographic graft patency. However 13% of RAG showed compromised flow with 6% having more than 75% stenosis in the proximal or distal anastomoses, which did not respond to GTN infusion. Seven percent of RAG (5/71) had diffused narrowing typical of string-sign. Only 87% of RAG were

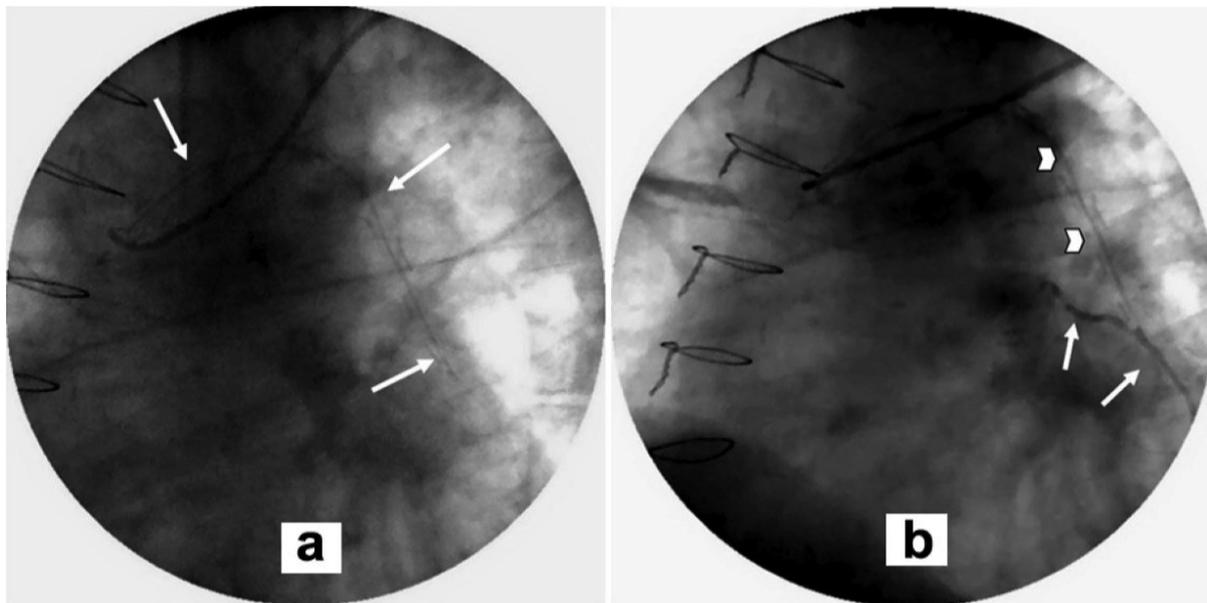


Figure 1: RA Grafts 'String-Sign'. (a) Angiographic frame showing RA graft string-sign at early angiography with minimal contrast in the native coronary artery (white arrows). Retrospective analysis of preoperative angiogram confirmed non-significant stenosis in target coronary artery. (Figure 2). (b) Post GTN infusion into the graft. There was an increase in contrast delivery into the graft with increase in luminal diameter of the graft (arrow heads) and presence of contrast in the native coronary artery (White arrows).

considered perfectly patent. There were no string-sign observed in any of the vein grafts screened but 1.6% (2/122) had anastomotic narrowing greater than 50% in the distal anastomoses.

Compromised RAG assessments

Five of the 71 RAG screened were found to be diffusely narrowed and classified as 'string-sign' (fig. 1a). Pre-operative angiograms analysis revealed non-significant lesions (<70%) in 3 cases only.

Mean RAG diameter in all 5 patients with 'string-sign' were 1.14 ± 0.25 mm (95% CI: 0.84 mm, 1.45 mm). Post nitrate infusion, the mean RAG diameter increased significantly to 1.38 ± 0.34 mm (95% CI: 0.96 mm, 1.80 mm, $p=0.04$), as shown in figure 1b. Dilatation to nitrate infusion in all 5 grafts ranges from 3.8% to 62.4%. Pre and post nitrate mean diameters of all 5 RAG with 'string-sign' were significantly smaller than normal mean RAG diameter 2.2 ± 0.5 mm (95% CI: 2.04mm, 2.45 mm, $p<0.0001$). Thus all 5 RAG with string-sign failed to achieve full dilatation despite nitrates

infusion. All patients were asymptomatic at time of graft angiography.

Only 1 patient agreed for reangiography at 1 year which revealed continual presence of the RAG string-sign (Figure 2a) which showed further increased in luminal angiographic diameter with GTN infusion down the graft (Figure 2b).

Discussion

'String-sign' in coronary bypass grafts is an interesting phenomenon and was first described in ITAG.¹ This phenomenon has also been reported in RAG and other arterial grafts.³⁻⁶ The causes or underlying mechanism is still uncertain but there are lots of anecdotal reports implicating competitive flow from native coronary arteries as a possible cause.^{1,7} Evidence for this were mainly from analysis of pre-operative and post-operative angiograms in grafts with string-sign, showing non-significantly stenosed (<75-90%) lesions in the native coronary arteries and the re-establishment of patency and flow several years later with the progression of the native coronary disease.^{1,5}

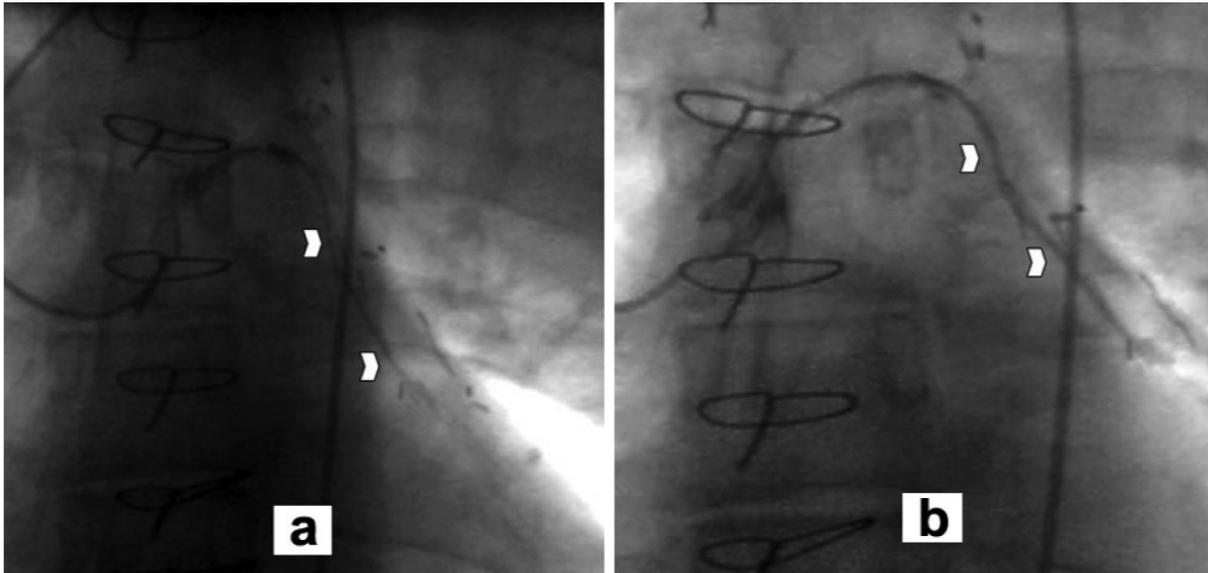


Figure 2: RA Grafts 'String-Sign' at 1 year angiography. (a) Angiographic frame showing the same RA at 1 year angiography which revealed a slight increase in the luminal diameter of the graft (white arrowheads). Again the lesion in the target coronary artery was non-significant. (b) Post GTN infusion into the graft showing an increase in luminal diameter of the graft at 1 year (white arrowheads).

The degree of target coronary stenosis at which string-sign will not occur is also uncertain. This has previously been reported to be in the order of more than 75% but recent multivariate analysis data from Miwa et al have shown a risk of RAG string-sign associated with a stenosis of less than 90%.⁶ According to data from Miwa et al, then all 5 patients in our study who developed string-sign had non-significantly stenosed target coronary arteries. Of the 3 patients in our group who had RAG to the Cx artery as part of the RVSP trial, only 2 patients had stenosis that satisfied the RSVP criteria with stenosis of 80-90%. In the remaining patient, the intended target Cx artery was found to be small and the RA was grafted to the intermediate coronary artery, which on retrospective analysis of the preoperative angiogram was found to be non-stenosed (Figure 3). The last 2 patients had RAG to the RCA at the surgeon's discretion as the SVG was randomised to the Cx artery. Both RCA had stenosis which were less than 70% (50% and 70%).

The underlying mechanism proposed for 'string-sign' in RAG was that of persistent diffuse graft spasm possibly due to the in-

crease contractile response to serotonin early after grafting.¹¹ This early hyper-reactivity to serotonin becomes attenuated with time probably leading to spasm resolution and thus to disappearance of conduit irregularities and even reopening of previously closed grafts.¹¹

We have shown here that the 5 RAG with string-sign only partially responded to

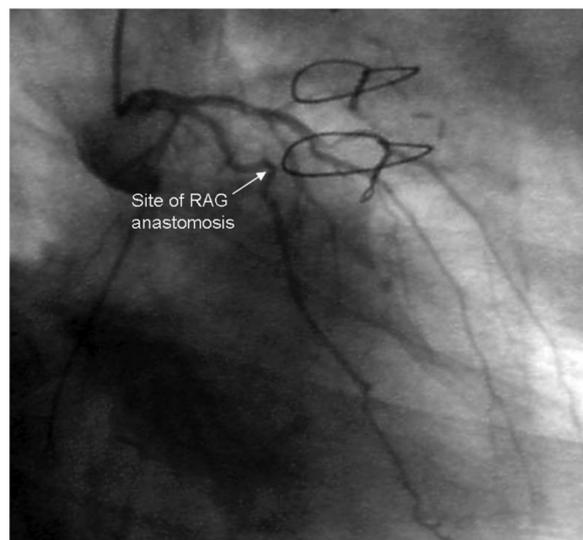


Figure 3: Retrospective analysis of coronary angiogram revealed a non-significantly stenosed target Intermediate coronary artery which account for competitive flow phenomenon leading to RAG string-sign as seen in figure 1.

GTN infusion, although the diameter increase was statistically significant. The failure to fully dilate suggests that diffuse graft vasospasm may play a limited role in RAG string-sign. Likewise, the chronic use of calcium channel blockers such as diltiazem has not been shown to improve RAG patency as was reported by other investigators.^{12, 13}

We hypothesize that the phenomenon of arterial graft string-sign is a physiological process rather than one of pathology. Due to competitive flow from the native coronary artery, flow in the graft is reduced. This reduction in graft flow resulted in reduction of flow velocity and wall shear stress which leads to a reduction in synthesis of NO by the endothelium.¹⁴ This ultimately leads to an imbalance between vasorelaxation by NO and vasoconstriction modulated by a host vasoactive substance such as adrenaline, noradrenaline, serotonin, thromboxane A₂, endothelin etc.¹⁵ The net effect is an excessive of vasoconstriction leading to diffuse vasospasm in the graft. Thus the reduction in graft luminal diameter may be an adaptive response to a state of low flow through the graft resulting from competitive flow through the native coronary artery.⁷ With progression of the native coronary artery stenosis, leading to a reduction of flow through the native coronary artery, the graft flow will steadily increase. Increase flow results in an increase in flow velocity and wall shear stress resulting in increase production of NO and ultimately to reopening of the graft.¹⁴

However it still remains a clinical controversy whether to graft a RA or any arterial grafts to a coronary vessel with less than 70-90% stenosis. The fact that observation of ITAG and RAG which were compromised by 'string-sign' at early angiography and later found to be patent when flow through the native coronary arteries were reduced as the proximal coronary lesions progressed to significant or critical degree, implies that such

grafts are not occluded but merely in a quiescence state like natural arterial collaterals.¹ Furthermore, all our patients with RAG string-sign were asymptomatic and did not complain of any angina at follow-up. Therefore, we may view RAG with string-sign as sleeping or dormant grafts.

Conclusions

The presence of competitive flow from the native coronary arteries which are non-significantly stenosed, combined with some degree of diffuse graft vasospasm may play a vital role in the pathogenesis RAG 'string-sign'. However, the degree at which a stenosis becomes significant varies considerably and has been suggested by recent multivariate analysis to be more than 90%. Although we believed that RAG string-sign are a physiological state of low flow rather than a diseased state, based on current evidence, we would still suggest grafting RA to a target coronary artery with stenosis greater than 90%.

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Larviciding Practice for Prevention and Control of Dengue among Urban Community.

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ABSTRACT

Introduction: Larviciding is one of the long-term measures that can help to eradicate Aedes larval breeding before they become adults. Local Health authorities have been conducting environmental larviciding activities at regular intervals and this may have altered the community's perception that vector-control activities are now the responsibility of government agencies and that the local community may not be required to practice larviciding. This study aims to determine level of knowledge, attitude and factors associated with larviciding practice among urban community. **Materials & Methods:** A cross-sectional survey was done in selected five local authority areas in Selangor state, Malaysia. Two stage random sampling using cluster random sampling for type of houses and systematic random sampling for selection of houses was used. Respondents were interviewed using structured questionnaire. Descriptive and bivariate statistical test (Spearman's correlation and Mann-U Whitney) were used. **Result:** A total of 2007 respondents were interviewed. About 48% of respondents practiced larviciding in their homes with only 15.8% had good level of practice. Majority (92.7%) of respondents reported that they would practice larviciding only if there is an outbreak of dengue with threat of death in their community. 69.4% of the respondents had good knowledge on larvicide and larviciding. Knowledge was significantly associated with education level ($p < 0.05$). About 49.4% of respondents were found to have good attitude towards larviciding. Knowledge ($r = 0.137, p < 0.05$) and attitude scores ($r = 0.087, p < 0.05$) were found to have a weak but significant positive correlation with practice of larviciding. Higher knowledge level ($U = 300173, p < 0.05$) and better attitude level ($U = 368265, p < 0.05$) was found to be significantly associated with larvicide usage. **Conclusion:** Despite having good levels of knowledge and attitude, the practice of larviciding among urban communities in Selangor state during peace time is still low. The level of practice of larviciding is dependent on whether there is an outbreak of dengue in the community or not.

Keywords: dengue, larvicide, vector, urban, aedes aegypti

INTRODUCTION

Dengue fever (DF) is one of the arthropod-viral diseases that had become an important public health problem. It is the most im-

portant mosquito-borne viral disease affecting humans, with the mosquito vector found in nearly 100 tropical countries. It affects tropical and sub-tropical areas around the world predominantly in urban and suburban areas. The global distribution of Ae-

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Aedes aegypti, the mosquito vector for the dengue viruses, is comparable to that of malaria, and an estimated 2.5 billion people live in areas at risk for epidemic transmission. World Health Organization (WHO) currently estimates there may be 390 million cases of dengue infection worldwide every year¹.

In Malaysia, dengue fever, which was first reported in 1902 has now become one of the major public health problems, especially with the emergence of dengue haemorrhagic fever (DHF) in 1962². Since the first report, a few other outbreaks were reported in which almost all had occurred among the urban community of Penang and Kuala Lumpur³⁻⁴. The incidence rate of DF for 2015 was 396.4 for every 100,000 population which was an increase from previous years. Case fatality rate for DHF was 0.28% in 2015 with a total of 336 deaths of both DF and DHF. Selangor state had contributed highest number of reported and confirmed cases in the country. In Selangor, incidence rate of dengue has been increasing especially for the past four years. In June 2016, the number of reported cases was 29,915 cases which is the highest recorded number ever reported⁵.

Over the last two decades there are massive infrastructure development and a very active construction sector for housing and commercial development especially in Selangor, creating many man-made opportunities for *Aedes* mosquito breeding. Therefore, it is undeniable that prevention and control strategies of DF and DHF needed to be strengthened at all level which should include healthcare authorities, non-healthcare agencies and most importantly the local community. The main player would be the local community because study in Brazil had shown that community participation and community mobilization would have resulted in more effective intervention for dengue control and prevention program⁶⁻⁷.

Among the strategies to prevent and control dengue outbreak is the larviciding practice which is one of the permanent and long-term measures that can help to eradicate *Aedes aegypti* larval breeding before they become adults. Larvicides are a type of pesticide used in mosquito control programmes. The main action is by killing the mosquito larvae. Larvicides used in dengue control and prevention programme in Selangor state includes biological insecticides such as *Bacillus Thuringiensis israelensis* (VECTOBAC) and other chemicals such as temephos (ABATE) and oils. Larvicide treatment of breeding habitats would help to reduce the adult mosquito population in nearby areas⁸. Other than that, larviciding process, which is the control of mosquito at the larval stage, is important because of the occurrence of transovarial dengue virus in wild population⁹.

The use of larvicide to prevent larval development in water-holding containers is indeed an essential component of dengue prevention and control program. Nevertheless, the continuous application of chemicals by vector control health staff had reinforced community perceptions that the government is responsible for all facets of vector control with little or no responsibility expected from them. This is the reality especially when larvicide was also given freely to the community by the health authorities during and between dengue outbreaks, which was highly endemic in urban areas.

Currently, most national programs are ill-equipped to manage the prevention and control aspects of a dengue program, and the implementer relies heavily on chemical control methods. Operationally, the majority of national dengue control programs provides emergency response to epidemics and is unable to effectively sustain the control of the proliferation of the mosquito. In Selangor, health authorities had found that larval habi-

tats were increasing in urban areas at an alarming rate. This was primarily due to the lack of manpower in local authorities to cover 100% of household inspection for *Aedes aegypti*. Other than that, there were also other reasons such as increased urbanization where semi-urban areas were lacking in basic infrastructure, the widespread use of non-biodegradable items, lack of adequate trash disposal and sanitary landfill systems as well as situations where local government was seen struggling to control unplanned housing development growth. All of these factors could contribute to increase in larval habitats existence¹⁰. Hence, the main objective of this study was to assess knowledge and attitude of the community and identify associated factors related to larviciding practice among the urban community.

METHODS:

Study design

This is a prospective cross-sectional study, which was carried out in the Petaling District, of Selangor during peacetime from 1 March 2009 to 31 December 2009. Petaling District is the most urbanised district in Selangor comprising of 1.5 million populations. This study involved urban communities from five local authorities of Selangor state, Malaysia.

Sampling method

The locality with highest reported dengue cases in year 2008 in each local authority was selected. Two-stage sampling method was applied in the selection of respondents. The first stage of cluster random sampling technique was used to sample type of houses, which could either be a high-cost house (include bungalow and semi-detached), medium-cost (included terraces and apartments) and low-cost housing (included landed low-cost and flat). Then, a systematic random sampling technique was used to select the sampled houses in each cluster. All members in the households aged 12 years old and above were given a self-administered ques-

tionnaire. Those who were illiterate and not able to understand Bahasa Malaysia or English languages were excluded.

Study instrument

Bilingual (Malay and English) structured questionnaire was used for data collection. The questionnaire consists of four parts which were Part A on sociodemographic data; Part B on knowledge about larvicide and larviciding (10 items); Part C on attitude on larvicide (5 items) and larviciding and Part D on practice of larvicide and larviciding (3 items). This is a newly developed questionnaire based on literature review. Keywords search consisted of dengue, dengue fever, larvicide and larviciding practice were used in library database comprised of PUBMED, Medline, EBSCOhost and search engine of Google Scholar. Three domains of knowledge, attitude and practice were discussed with two experts in epidemiology and communicable diseases for content validity. The questionnaire items were in two languages (English and Malay). Pre-testing of the questionnaire was conducted among selected 30 respondents from the community, internal consistency was acceptable with Cronbach alpha at 0.847 for knowledge domain, 0.638 for attitude domain and 0.433 for practice domain.

The knowledge level was divided into two categories: good knowledge (score ≥ 6) and poor knowledge (score < 5) using the accepted cut off point decided by the expert group of public health specialist after pre-testing of the questionnaire. The cut-off point 5 was set based on minimum score that respondents need to obtain about knowledge on larviciding and larvicide (25% right answer). The attitude level was divided into three categories: good attitude (score ≥ 9), moderate attitude (score 6 to 8) and poor attitude (score ≤ 5), meanwhile practice level was divided into 2 categories: good practice (score ≥ 5), and poor practice (score ≤ 4). Cut-off point was decided based on discussion with

the expert panel of public health specialist after pre-testing of the questionnaire.

Data analysis

All data entry and statistical analysis was done using SPSS version 23.0. Descriptive analysis was done and presented as median and interquartile range (IQR) for this study data that was not normally distributed. Hypothesis testing was done using chi square test of independence and non-parametric test including Spearman's correlation and Mann-U Whitney test.

Ethical statement

This study was approved by the Research Ethics Committee of Universiti Teknologi MA-RA.

RESULTS

A total of 2007 respondents were interviewed. Table 1 shows the details on the socio-demographic profile of the respondents. The median age of respondents was 38.0 years old (IQR± 24). Majority of them were females and married. Most were Malays followed by Indian and Chinese. More than half of the respondents had secondary education while 17.3% and 15.7% had tertiary and primary education respectively. Majority of respondents stayed in medium-cost houses and very small proportion of the respondents stayed in high-cost houses. Furthermore, about one third of the respondents' household income was less than RM1, 000 (USD 250) per month (USD, exchange rate [2008] USD1= RM3.99).

Level of knowledge on Larvicide and Larviciding and association with larviciding Practice

In this study the knowledge score of the respondents ranged between 0 and 19 with median score of 7. Proportion of respondent with good knowledge was 69.4% and further analysis of the questions on knowledge revealed

that majority (90.6%) knew about the location and place of mosquito breeding site. However, only less than half of the respondent (44.6%) knew that larvicide could be easily obtained in the market. Chi-square test of independence showed that knowledge level was significantly associated with education level ($p < 0.05$). It was also found that knowledge level was significantly associated with practice of larviciding ($r = 0.137$, $p < 0.05$).

Level of Attitude on larvicide and larviciding and association with larviciding practice

For the attitude score of the respondents it ranged between 0 and 13 with median score of 7. Majority of respondents 49.4% had good attitude while about one third of them (28.2%) had poor attitude. Majority of respondents (92.7%) admitted that they will definitely be willing to consider larviciding if there was death due to dengue in their areas. Furthermore, it was found that attitude level was positively but weakly associated and practice of larviciding ($r = 0.087$, $p < 0.05$).

Practice of larviciding and users of larvicide

As for the practice of larviciding, the practice score of the respondents ranged between 0 and 6 with median score of 4. Majority (84.2%) of the respondents were found to be poorly practicing larviciding. Only small proportion (15.8%) of the respondents had good practice. Majority of respondents admitted that they were not using larvicide in the past (51.7%).

Association of knowledge and attitude between larvicide users and non-users

The level of knowledge in larvicide users was higher compared to the non-users ($U = 300173$, $p < 0.05$). Similarly, higher attitude score was found among the larvicide users compared to the non-users ($U = 368265$, $p < 0.05$).

DISCUSSION

Findings from this study revealed that more than half of the respondents had good knowledge score on larvicides and larviciding. This finding echoed findings from two other local studies, which reported good to high level of knowledge on dengue among their respondents.^{11, 12} It also supported another study in Thailand in 2006, which had found that knowledge of Abate; which is common larvicide for dengue prevention as a measure to prevent dengue was known by majority of respondents as compared to other preventive measures.¹³

Consequently, level of attitude among the majority of respondents towards larviciding was also found to be good and significantly correlated with the practice of larviciding. These findings also consistent with earlier study by Mohamad *et al* that stated attitude of respondents on dengue prevention practice were good.¹¹ For present study, these could be due to the fact that this study locations were in the area of previous dengue outbreak which might have translated into increased level of awareness among respondents which in turn lead to increased level of knowledge and attitude towards larviciding. Rationale for this could be seen as comparable to findings in an earlier study in Thailand which had found that an increased in health education such as knowledge imparted to mothers in their population could resulted in the significant increased in the proportion of mothers with attitude of larvicides were the best control method to prevent dengue. Moreover, this increased in term of knowledge also contribute to positive impact on the attitude and practice on preventive measures of dengue. Another study in Malaysia also reported that respondents with good knowledge also had better attitude towards dengue control measures and significant association was revealed between the knowledge on dengue with level of attitude

towards dengue prevention and control.¹⁴

Unfortunately, majority of respondents had poor practice of larviciding and only small percentages of respondents showed good practice. This was not surprising reason being, these findings appeared to be consistent with one previous study in this country which found that good knowledge on dengue does not necessarily lead to good practice of larviciding for dengue control.¹⁴ This study was conducted during peacetime when there was no outbreak of dengue fever in the community and majority of the respondents have reported that they would practice larviciding during outbreaks. A local study carried out in a rural community in Trengganu during an outbreak did report that almost all of their respondents performed good practice against dengue infection.¹² Thus, as with any communities, preventive measures have a very high uptake whenever there is active outbreak with threat of death and this practice generally drops during peacetime, when the risk of infection and death is at its lowest.

Additionally, in this study almost less than half of the respondents reported using larvicide despite the fact that one of the larvicide, temephos (ABATE) was given free of charge to the community especially during dengue outbreaks in their area. This finding was similar with finding of study in 2016 done among rural community that showed that only 38.8% of respondents used abate in their water containers. This could be a signal of probable negative indicator of community participation in dengue prevention and control in this urban community setting.

Lastly, there was a significant association between knowledge level of users and non-users of larvicide. This finding when added with the result that showed significant association between attitude level of users and non-users of larvicide could means that majority of non-users have poor knowledge

about larvicide and vice versa. As for attitude, majority of larvicide users have good attitude on larviciding as compared to non-users of larvicide.

Study limitation

The limitations in this study were, although significant association was found between variables of interest, the nature of the data that was not normally distributed means that only non-parametric test were able to be conducted and therefore, a more in-depth analysis between variables were unable to be explored further. This study also was limited in term of the geographical area sampled was only confined to previous dengue outbreak areas and hence, further research would be needed to investigate whether communities in non-affected areas also presented with similar findings. The findings were also limited to literate and respondents who understood English or Malay language. In terms of sampling approach, respondents' housing type was not evenly distributed based on random selection of house type clusters from five different localities. Moreover, most of high-cost house owners refuse to participate in this study leading to above-mentioned findings. Nevertheless, the strength of this study was the fact that study respondents was sampled randomly and thus would eliminate any selection bias that might distort this study findings.

In conclusion, this study had found that majority of urban community dwellers in Selangor have good knowledge and attitude on larvicide and larviciding. However, less than half of the community used larvicide as a preventive measure for dengue control. Knowledge and attitude were significantly correlated with practice. Therefore, policy makers and related agencies need to advocate control and prevention measures which optimize and utilize the health education and health promotion aspect on larvicide and lar-

viciding to approach the community especially in the outbreak areas in order to improve community participation for dengue control and prevention.

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Figure 1

A 28 years old primigravida presented with acute lower abdominal pain and difficulty walking following a vacuum assisted vaginal delivery. On examination there was tenderness over the pubic area, but did not have any clinical signs in her lower limbs.

A radiograph was taken. (Figure 1)

What is the diagnosis?

Answer: refer to page 77

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LOH Chow Chin, Hanizasurana HASHIM, Nor Fariza NGAH**Figure 1. Left eye fundus photo at event time.****Figure 2. Left eye fundus post 1 month event (after treatment).**

A 46 year old gentlemen with no previous medical comorbidities presented with acute, painless visual reduction in the left eye for 12 hours duration. He was a chronic smoker who smoke 30 cigarettes per day for the past 20 years. He denied associated headache, jaw claudication, nor other connective tissue disease symptoms. On clinical examination, his visual acuity was counting finger at a distance of 1 feet on his left eye and 6/9 on his right. Findings of anterior segment examinations of both eyes were unremarkable. Fundus examination showed a patch of whitening of the retina left of the optic nerve (Figure 1). Immediate ocular massage using Goldman 3 mirror, applying self-rebreathing bag and anterior chamber paracentesis were performed. His vision improved after the manoeuvres. Fundus examination 1 month later showed resolution of the patch of whitening in the retina (Figure 2).

What is diagnosis?**Answer:** refer to page 78

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Gynaecological complications of leech bite.

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ABSTRACT

In tropical countries, leech bites are common and reported to cause life-threatening complications. We would like to highlight two cases that represented acute and chronic gynaecological complications of leech bites. First case was a two-year-old girl who presented with persistent vaginal bleeding complicated by disseminated intravascular coagulopathy after a leech was forcefully removed from her introitus. Second case was a 15-year-old girl who presented with a history of progressive difficulty and incomplete micturition three years after an incident with a leech bite at the vulva region. She was noted to have complete midline fusion of her labia minora with a pinhole orifice, which required surgical intervention. These two cases highlights the acute and chronic complications that can arise from such a simple leech bites which can be life threatening. Awareness of such potential complications of leech bites will lead to early referral and early treatment.

Keywords: leech bite, vaginal bleeding, labial fusion, Z-plasty

INTRODUCTION

Leeches are blood-sucking hermaphroditic parasites that belong to phylum Annelida of class Hirudinea. Leeches suck the blood without causing pain by using three sharp teeth located in the upper jaw. The presence of hirudin as the anticoagulant agent in the leech's saliva may lead the wound to have persistent bleeding for hours.¹

Leeches are generally not harmful to humans when bites are external. However, once they invade through human body orifices while swimming in the river or using contaminated water, they can cause significant morbidities. Leech bites to the nose, pharynx, urethra, bladder and rectum had been reported.²⁻⁴

Vaginal bleeding due to leech bites is uncommon.⁴⁻⁵ Moreover, no literature has ever reported chronic complications of leech bites. In this report, we discussed two cases, which presented as acute and chronic complications of leech bites, and their respective treatments.

CASE REPORT

Case 1

A two-year old girl was noted to have a leech bite at her vagina after playing in the flood-water. The leech was hooked to the vaginal wall while its tail was dangling off the introitus. Inadvertently, the leech was pulled off forcefully causing persistent bleeding in the vagina. She was presented to the Emergency Department approximately two hours later due to difficulty in getting transport at the remote area. Clinically, she was pale albeit vital

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signs were recorded as stable. Since bleeding was imminent, she lost an estimated 200ml of blood which resulted in a drop of haemoglobin to 7g/dl. Examination under anaesthesia and vaginal irrigation with normal saline was carried out. Bleeding was controlled after first irrigation but unfortunately recurred after five hours. She was then brought back to operation theatre and noted to have persistent bleeding which was complicated with disseminated intravascular coagulopathy (DIC) with low platelet count ($6 \times 10^9/L$) and deranged coagulation profile (PT 18.4, aPTT 56.3). Bleeding was eventually stopped with irrigation and vaginal packing, while the DIC was corrected with fresh frozen plasma. Total estimated blood loss was 600ml. Patient was transfused with a total of 48ml/kg of packed cells and 300ml of fresh frozen plasma. Antibiotic was administered. She was well at day four of hospitalisation, and then was discharged.

Case 2

A 15-year old girl was presented with a history of difficulty in urinary voiding for three years. Her history of presentation started after an episode of a leech bite at the labial region at the age of 12 years. Following the removal of the leech, an active bleeding from the affected area ensued but ceased spontaneously. Subsequently, she started to experience difficulty in passing urine but had been concealing the symptoms from her parents until it worsened. She attained menarche at the age of 11 and had regular menstrual periods. There was no other history of genital procedure, genital trauma or recurrent infection over the groin region after the incident of leech bite.

On pelvic examination, a complete midline fusion of labia minora was seen, with only a pinhole opening for passage of urine and menses. Urethral and vaginal opening were not assessable. Trans-abdominal ultrasound revealed insignificant findings of ova-

ries and uterus.

Case was subsequently referred to a plastic surgery team for reconstructive management. Surgical labial separation was performed (Figure 1). Separation was done with multiple Z-plasty technique. On day 1 post-operation, urinary bladder catheter was removed and the patient was subsequently able to pass urine smoothly. Upon a clinical follow-up after three months, she had no obstructive urinary symptoms. Her labia minora is well separated and poised with a natural-looking structure. Part of the tissue from the fusion labia minora was sent for histopathology examination and mainly revealed fibrotic tissue.

Discussion

Leech bite is a rare cause for vaginal bleeding, but should be kept in mind; especially in tropical countries. Proper history is of utmost importance for diagnosis because in majority of cases, the leech is removed or has migrated prior to arrival to the hospital. A history of swimming in the river, ponds, swamps, flood-water or using contaminated water prior to



Figure 1: Fusion of labial minora with one small orifice, both urethral and vaginal opening were covered. Pre-operative Z-plasty was planned.

the onset of bleeding may suggest underlying leech bites.

In terms of on-site treatment, removal of the leech by putting salt or normal saline was reported to be effective. The leech may detach from the bite due to loss of body water in hypertonic milieu.^{2,4} Other described methods of leech removal include the use of glycerine phenice,³ injection of lignocaine to paralyse the leech⁵ and application of vinegar. Leeches should not be removed forcefully as their jaws may remain in the wound and become a nidus of infections.⁶ Moreover, injury to the fragile tissue, for instance at the vaginal wall, can lead to profuse bleeding (Case 1) and 'secondary' tissue inflammation with fusion of raw area of both sides of the labia (Case 2). Bleeding caused by leech bites will usually stop spontaneously. Persistent bleeding after leech bites can be attributed to several reasons: first, due to hirudin from its saliva, which acts as an anticoagulant by inhibiting factor IXa and thrombin in the coagulation chain. Hyaluronise and calin are also present in the leeches' saliva and possess similar anticoagulant property. Bleeding can be persistent for up to 10 hours to seven days.^{1,3} Secondly, migration of the leech to deeper tissue structure may lead to bleeding complications. Thirdly, consequent disseminated intravascular coagulopathy as a secondary complication is due to significant blood loss; as what had occurred in our patient (first case).

To the best of our knowledge, there is no report on the chronic complications of leech bites yet. Leech bites cause small wounds, which will usually heal without much complications. However, proper wound care at the genitalia region is indicated because of its moist environment that poses higher risk for secondary infections and inflammation. As in our patient (second case), labial fusion could be due to the intense inflammation and infection that had occurred.

Labial fusion commonly involves pre-pubertal and postmenopausal women due to hypoestrogenic status. Majority of patients respond to estrogen cream for separation. In comparison with our patient, the labial fusion involved intense fibrosis and surgical intervention. Surgical separation was carried out with Z-plasty technique as single step surgery. Z-plasty closure helped in scar lengthening and prevention of scar contracture. Secondly, it keeps reconstructed labia minora slightly apart to reduce the risk of fusion. In comparison with previous literatures, adhesiolysis was carried out without sharp dissection by using Hegar's dilator and curved forceps in an advancing and expanding manner.⁷⁻⁸ This method is not suitable for patients with dense fibrosis which carry higher risk for scar contracture and re-fusion post operation.

In conclusion, Leech bites can lead to potential acute and chronic complications. Doctors working in rural areas should be aware of them. Diagnosis and treatment must be promptly carried out to prevent secondary complications from leech bites. Tertiary hospital referral should be done with no delay in acute cases.

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A challenging case of Pelvi-Acetabular fracture in a patient with Achondroplasia .

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ABSTRACT

Achondroplasia is characterized by dwarfism and typical changes in the size and shape of bones particularly of the pelvis. Additional anatomical features and presence of co-existing medical problems, poses significant anaesthetic problems. Pelvic and acetabular fractures in achondroplasia are rare and there is a scarcity of literature about management of these fractures. We report a case of 55 years old lady with achondroplasia who sustained pelvi-acetabular fracture that was successfully managed by two staged surgery, to highlight the orthopaedic and anaesthetic challenges.

Key words: Achondroplasia, pelvic, acetabulum, fracture

INTRODUCTION

Fractures in a patient with achondroplasia pose orthopaedic and anaesthetic challenges for management. Various bony and soft tissue abnormalities are well documented, which results in difficulty of access to the operative field and need for special instrumentations and implants to fix the fractures.^{1,2} Anaesthetic challenges include long hours of operation, difficulty in positioning and intubation, increased blood loss, and restrictive lung disease.³ In this case report we highlight the challenges of surgical management of pelvi-acetabular fracture in a 55 years old lady with achondroplasia.

CASE REPORT

A 55-year-old lady with achondroplasia sustained a pelvi-acetabular fracture following a road traffic accident. She was about 30 kg in

weight and 120 cm in height. She was an asthmatic on bronchodilator inhalers. She was haemodynamically stable. Radiographs of the pelvis and acetabulum and CT scan of the pelvis revealed comminuted fracture of the right ilium extending to the acetabulum, undisplaced fracture of the left ilium, bilateral superior pubic ramii and left inferior pubic ramus fracture and diastasis of the left sacroiliac joint (Figs. 1, 2).

Her blood investigations were normal and an echocardiogram showed an ejection fraction of 67%, normal valves and chamber dimensions with minimal left ventricular hypertrophy and mild diastolic dysfunction. There were no features of pulmonary hypertension or cor pulmonale.

Anaesthetic assessment showed minimal restriction of neck movements, but adequate mouth opening with oropharyngeal class III: visualization of the soft palate and

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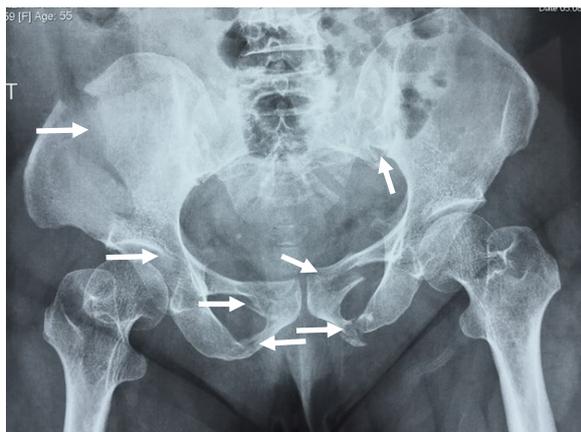


Fig. 1: Pre-operative radiograph (White solid arrows indicating points of fracture of the pelvis)

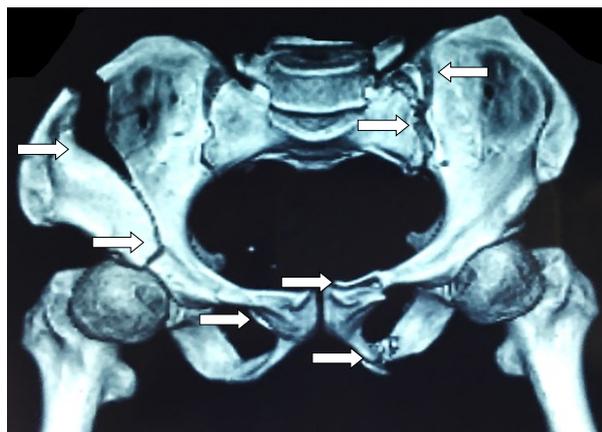


Fig. 2: Pre-operative 3-D CT reconstruction (White solid arrows indicating points of fracture of the pelvis).

the base of uvula according to the Mallampati score. There were no features of obstructive sleep apnoea. She was noted to have ASA III according to the American Society of Anesthesiologists (ASA) physical status classification evaluation suggesting severe systemic disease that limits activity but is not incapacitating. The patient was also counselled by the anaesthetists about the various procedures involved before the first stage surgery.

She was scheduled for an open reduction and internal fixation of the acetabulum and ilium as well as the contralateral sacroiliac joint, on a semi-urgent basis in stages anticipating intra-operative difficulties and challenges from prolonged anaesthesia after discussion with the anaesthetist.

In the first stage, adequate venous access and non-invasive monitoring was first established. For anaesthesia, fiberoptic intubation was performed orally using a 6.0 cuffed PVC endotracheal tube taking extreme care to minimise all neck movements and keeping difficult airway cart as standby. Surgery was commenced after adequate positioning and ensuring padding. An anterior ili-inguinal approach was used with the patient in the supine position. For fixation of the anterior column fracture, a 6-hole well contoured AO reconstruction plate was used to span over the endopelvic surface of acetabu-

lum (quadrilateral plate), and fixed to the pubic ramus. A second 6-hole AO reconstruction plate was used to span the iliac crest bridging the two halves of the anterior wing of Ilium that was separated by the injury. The duration of surgery was 3 hours 45 minutes. After routine reversal of anaesthesia patient was shifted to intensive care unit for monitoring.

After a gap of 1 week, in the second stage, the sacroiliac disruption was fixed with percutaneous single cancellous AO 7.3 mm half threaded screw with washer to effect compression of iliosacral disruption. This procedure was also performed under general anaesthesia with due care as during the first stage and lasted 1 hour and 15 minutes.

Post-operative radiographs were satisfactory (Fig. 3). She was started on chest and upper and lower limb exercises in bed. In view of her osteoporotic bones, weight bearing was delayed for 6 weeks and she was allowed ambulation in a wheel chair. At discharge, she was commenced on anti-resorptive therapy using alendronate, calcitriol and calcium lactate.

At last followup, 12 months after surgery, the patient was able to walk full weight bearing without limp. Follow up radiographs revealed good healing of fractures with maintained reduction and implant position.



Fig. 3: Post-operative radiograph showing plates and screws using for internal fixation of the fractured components of the pelvis.

Discussion

There is paucity of literature about management of fractures in patients with achondroplasia, which presents both orthopaedic and anaesthetic challenges.

Based on the study of literature and analysis of the imaging studies, the following issues related to surgery were anticipated and discussed. The deformed and small bones, restricted exposure, osteoporotic bones and need for specialized instrumentation and implants.

The pelvis and hip differs from normal patients in the horizontal acetabular roof (decreased acetabular angle), small squared iliac wings, small trident pelvis, champagne glass type pelvic inlet, short sacroiliac notches and hip flexion contractures.^{1,2} This may result in the requirement for modifications and possible compromises in the fixation.⁴ Anatomical peculiarities and possible joint contractures may make positioning difficult, and special care must be taken to position and pad pressure points adequately. However, in our case we did not have to use any special approach or implants. Low bone density has also been documented in a recent study on patients with achondroplasia.⁵ Due to lack of AO locking reconstruction plates, which would have been ideal for this case, regular plates

were used. Owing to the smaller size and altered shape of the sacral promontory, fixation of the left sacro-iliac joint was done using a single screw which could not cross the midline as is generally practiced.

In the management of a patient with achondroplasia and distal femur fracture, Murphy *et al* have highlighted the problem of abnormal anatomy and size of bones which makes use of routine implants difficult.⁴ They have also referred to poor bone quality in such patients which can compromise the stability of the fixation.

From anaesthesia consideration, achondroplastics have facial features that may make airway management problematic. In addition, there is limited flexibility of the atlanto-occipital joint with risk of foramen magnum stenosis and cervical instability.³ Due to the above issues, it was decided to secure the airway by fiberoptic intubation, minimising neck movements. Selecting the size of the endotracheal tube in achondroplastics must be based on body weight rather than age. Hence a size 6 endotracheal tube was used. Although these patients are described to be anxious, there is a possibility of obstructive sleep apnoea in addition to airway difficulties.⁶ Hence we chose to allay the patient's anxiety by explanation and reassurance and not sedatives or anxiolytics.

In conclusion, patients with achondroplasia are affected by numerous medical comorbidities and this combined with the disproportionate bony abnormalities can raise many challenges in surgical management of fractures. Adequate pre-operative workup, careful planning with multi-disciplinary approach for perioperative care can help in avoiding complications.

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Successful Bronchoscopic Lung Volume Reduction Using Endobronchial Valve for Severe Right Lower Lobe Emphysema.

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ABSTRACT

Chronic obstructive pulmonary disease is a common disease worldwide. Most patients with advanced chronic obstructive pulmonary disease will only receive maximum inhaler therapy plus other non-pharmacological treatments (vaccination, pulmonary rehabilitation, oxygen therapy). Bronchoscopic lung volume reduction by endobronchial valve insertion is an option available in interventional pulmonology centres for eligible patients. We report a 72-year-old man with severe airflow limitation plus hyperinflation and air trapping who received endobronchial valve insertion in the right lower lobe. His residual volume reduced remarkably from 14.1L (778%) to 5.57L (292%) following 1 year with symptomatic improvement which was sustained after 2 years follow-up. In conclusion, bronchoscopic lung volume reduction by endobronchial valve insertion is a treatment option for advanced chronic obstructive pulmonary disease patients on maximal medical therapy. It may achieve the same effect on respiratory function as lung volume reduction surgery, but without the added disadvantages of morbidity and mortality associated with surgery.

Keywords : Bronchoscopic lung volume reduction, chronic obstructive pulmonary disease, endobronchial valve, lung volume reduction surgery

INTRODUCTION

Bronchoscopic lung volume reduction (BLVR) by endobronchial valve (EBV) insertion for severe emphysema was first published in 2003 by Toma et al.¹ EBV is placed in the most emphysematous part of the lung with the aim to induce partial atelectasis. Once deployed, the one-way valve allows trapped air in the diseased part to escape but prevents influx of airflow. Reduction of lung volume improves lung mechanics thus enabling better gaseous exchange. BLVR in predominant upper lobe emphysema is well estab-

lished, however its use in lower lobe emphysema is unclear.² Our patient had EBV placed in the right lower lobe (apical, medial, anterior, lateral and posterior segment) with successful result. Currently in Serdang Pulmonology Unit, symptomatic chronic obstructive pulmonary disease (COPD) patients with FEV1 of 15%-45% predicted and residual volume greater than 175% predicted are eligible for assessment of EBV insertion. As of June 2017, 14 patients with severe COPD had received EBV insertion. However, with further studies, we should consider changing our practice to offer EBV insertion to COPD patients whose residual volumes are greater than 150%.²⁻⁴ This case highlights the service availability of managing advanced COPD cases whereby

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predominant lower lobe emphysema is not a contraindication for BLVR.

Case Report

A 72-years-old man was diagnosed with COPD since the age of 65. He is an ex-smoker of 75 pack years and has been under our regular follow-up since 2011. He has persistent cough with phlegm and reduced effort tolerance. The Modified Medical Research Council (MMRC) dyspneic score was 3 and he could not climb more than 6 steps of stairs. Being a grocery shop owner, he could no longer drive his mini-lorry, as he was too weak to handle the steering wheel. During follow-up, he had received various inhalers in a step-wise pattern. His inhaler therapy prior to intervention includes salmeterol/fluticasone (50/250) twice daily and tiotropium spiriva respimat® 5mcg once daily where he was compliant and showed good inhaler technique. Newer inhaler combinations were not available back then.

The patient had 10 visits to the emergency department for nebulisations and 3 admissions for acute exacerbation of COPD between 2011 and 2013. The COPD assessment tool (CAT) score was persistently more than 20. He attended pulmonary rehabilitation which resulted in modest symptomatic improvement. He received pneumococcal vaccination and yearly influenza vaccinations. Physical examination revealed evidence of generalised muscle wasting with BMI of 17kg/m² and generalised reduced breath sounds bilaterally. There were no signs of heart failure.

Initial respiratory function test (Table 1) in September 2013 showed severe airflow limitation (FEV1 0.67L / 30% predicted, FEV1/FVC ratio 56%). There was also hyperinflation (total lung capacity 16.1L / 341% predicted) and air trapping (residual volume - 14.7L / 778% predicted). The gas transfer

Table 1: Serial general respiratory function test pre and post EBV insertion.

	Pre EBV insertion (Sept 2013)	11 months post EBV insertion (Feb 2015)	15 months post EBV insertion (Jun 2015)
FEV1 (L)	0.67 (30%)	1.19 (52%)	1.2 (54%)
FVC (L)	1.19 (67%)	2.40 (73%)	2.35 (72%)
TLC (L)	16.2 (341%)	6.36 (134%)	7.95 (168%)
RV (L)	14.73 (778%)	3.95 (209%)	5.57 (292%)
DLCO Adj	7.9 (67%)	9.9 (83%)	8.2 (69%)

FEV1 : Forced expiratory flow at 1 second, FVC : Forced vital capacity, TLC : Total lung capacity, RV : Residual volume, DLCO Adj : Corrected gas transfer for haemoglobin.

coefficient is reduced consistent with emphysemasema. Chest x-ray (CXR) revealed hyperinflated lungs with flattening of both hemidiaphragms. High resolution computed tomography (HRCT) of the chest showed heterogenous emphysema predominantly in the lower lobes with complete fissures bilaterally (Figure 1). Alpha-1 anti-trypsin levels were normal.

A decision was made for BLVR by EBV insertion targeted towards the right lower lobe. This procedure was performed in March 2014. Airway was secured via rigid intubation and no collateral ventilation detected using the Chartis system. Three zephyr® EBVs; 2 units size 4, 1 unit size 5.5 (Figure 2A) were deployed at the right lower lobe at subsegment apical (RB6), medial (RB7), anterior (RB8), lateral (RB9) and posterior (RB10) using the zephyr® endobronchial delivery catheter (Figure 2B). In comparison with pre-procedural chest X-ray (Figure 3A), immediate CXR post procedure (Figure 3B) showed doming of the right hemidiaphragm indicating successful BLVR. Patient was observed for 72 hours before discharge and did not develop any complications particularly pneumothorax. On review 1 month later, he showed remarkable improvement of his symptoms. Gradually he regained his strength. He is able to drive, leave his house confidently and is able to

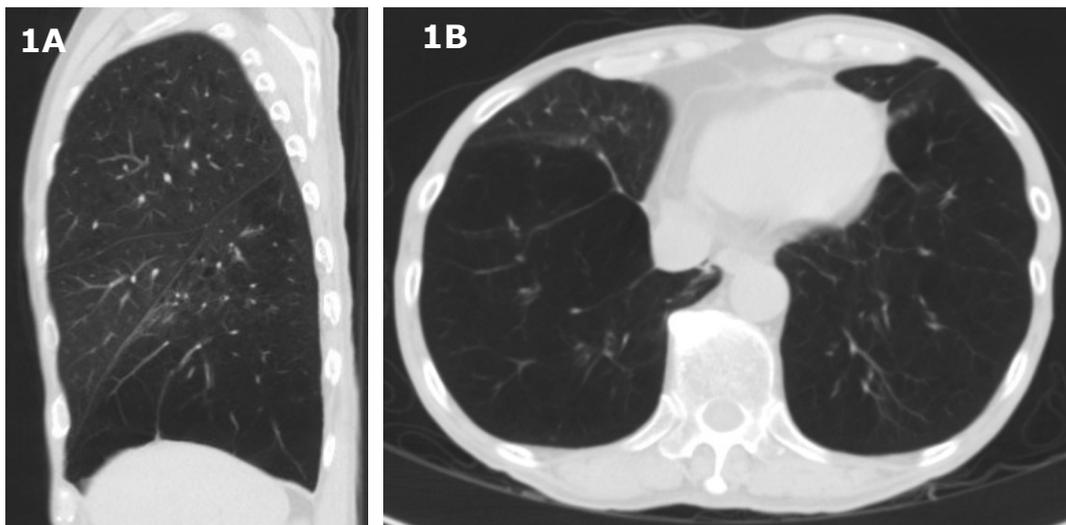


Figure 1: HRCT Thorax right sagittal view (Figure 1A) and axial view (Figure 1B) showing heterogenous emphysema with lower lobe predominance and complete fissures. (Please click on image to enlarge)

climb 15 steps of stairs. His CAT score was 8. He had no visits to the emergency department or admissions for COPD in 2014. Eleven months later, repeat general respiratory function test showed significant improvement of airflow limitation, hyperinflation and air trapping (Table 1). Residual volume had improved by 62% and FEV1 had improved by 79% during his current review with sustainable symptomatic improvement.

Discussion

BLVR by EBV insertion is one of the emerging interventional pulmonology treatment modalities available for advanced COPD apart from insertion of endobronchial coils. However, there are limitations which include lack of specialised skills and exorbitant costs resulting in eligible patients denied of this procedure. Prior to the availability of EBV insertion, eligible patients based on NETT protocol

would have had the option for LVRS. However, clinicians would find EBV insertion more desirable than surgical LVRS as the latter is associated with longer length of hospital stay and increased perioperative mortality despite absence of comparable trials between the two. In the latest Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017 guideline, the updated recommendation have included usage of EBV as a treatment option for advanced emphysema without collateral ventilation. These interventions improve exercise tolerance, health-status, lung function 6-12 months following treatment and reduce end-expiratory lung volume.⁵

At present, inclusion criteria for EBV insertion in Serdang Pulmonology Unit are FEV1 of 15-45% predicted, residual volume greater than 175% predicted and HRCT scan showing heterogenous emphysema with complete fissure. Fifteen patients in our hospital were excluded despite meeting respiratory function criteria as they had incomplete fissure on HRCT. Our inclusion criteria using residual volume greater than 175% is almost similar to a study carried out by Herth et al.⁶ However, there are other trials such as NETT, BeLieVeR-HiFi and STELVIO that enrolled pa-



Figure 2: Endobronchial valves of different sizes used for the bronchoscope lung volume reduction (Figure 2A) deployed using the endobronchial delivery catheter (Figure 2B). (Please click on image to enlarge)

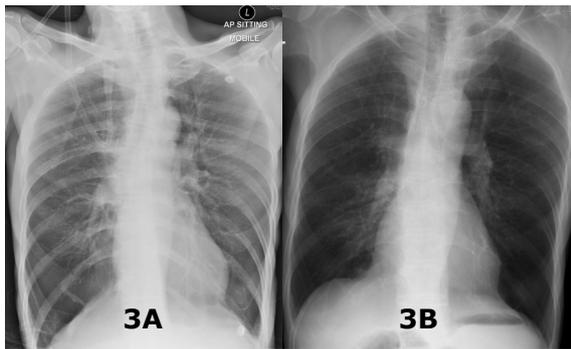


Figure 3: CXR pre EBV insertion showing hyperinflation of the lung with flattening of both hemidiaphragm (Figure 3A). CXR 2 hours post EBV showing doming of the right hemidiaphragm (Figure 3B). (Click on the image to enlarge)

tients with residual volumes of greater than 150% predicted.²⁻⁴

EBV will be deployed once fissure integrity is determined using signals by the Chartis system.⁷ It can be deployed either by conscious local sedation or through rigid bronchoscopy following general anesthesia. We prefer to do it via rigid bronchoscopy as one could not predict the anatomical variation that a patient may have. Coughing as a result of irritation to the bronchial wall during procedure complicates the matter and this can be overcome by performing it in a relaxed controlled situation under general anaesthesia. Nevertheless, mode of the EBV deployment depends on the bronchoscopist's preference.

Following the procedure, patients need to be observed as pneumothorax is an expected complication due to rapid total lung reduction. The median time of the onset of pneumothorax to EBV insertion is 2 days.⁶ It is believed that pneumothorax may be an indicator of successful EBV therapy as patients experienced clinically significant improvement once the air leak stopped.⁸ In our practice, patients are allowed to be discharged after 3 days if they do not develop any complications.

Our patient had a remarkable improvement of FEV1 by 77.6% (table 1) and residual volume by 73.2% following EBV insertion. What is more impressive is that the EBV was inserted in the right lower lobe which is a relative contraindication based on NETT protocol. Furthermore, from being a home-bound person, he is now back to his usual daily routine activity and able to drive his mini-lorry.

In conclusion, BLVR by EBV insertion is available in Malaysia for advanced COPD patients on maximal medical therapy. It may achieve similar improvement of respiratory function with lung volume reduction surgery without the added perioperative morbidity and mortality.

Consent

Written informed consent was obtained from the patient for publication of this case report.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MFAH is the main author and corresponding author for this article. MZ and JAR edited and approved the final version of the case report. All authors approved the final manuscript as submitted.

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Answer: Diastasis of the pubis symphysis

The pubic symphysis is a secondary cartilage like joint classified as amphiarthrosi which is covered by a layer of hyaline cartilage with an interposed, softer fibrocartilaginous disc acting as a buffer.¹ It has very limited movements except under hormonal stimulation during the third trimester of pregnancy or during labour when the two pubic bone progressively move apart to accommodate delivery of the fetus.² In normal conditions these movements are in the range of 0.5-1 mm.³ Starting from the seventh month of pregnancy, a widening of the sacro-iliac joint and the pubic symphysis occurs. A diastasis of the pubic symphysis after delivery can be a painful complication that causes serious distress to the patient.⁴

Clinically, the patient complains of pain, with swelling and sometimes deformity appearing in the involved area. In some cases it is possible to hear a clicking sound when the patient walks.⁵ The diagnostic test for this condition is an anteroposterior radiograph of the pelvis. Many advocate the conservative treatment which consists of lying in a hammock (placed above the bed), lateral decubitus bed rest, a pelvic girdle, walking aids, progressive mobilization, pelvic binder or , pelvic traction.⁶

The pain increases when manual pressure is applied to the pelvis in a latero-lateral and antero-posterior direction. If the dislocation is severe it can be accompanied by shock. A small percentage of patients can develop chronic pain requiring a surgical intervention of debridement or a pubic symphysis fusion.⁷

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Answer: Left eye cilioretinal artery occlusion

Although retinal artery occlusion is relatively infrequent, it is an ocular emergency because it causes irreversible visual loss unless the retinal circulation is re-established prior to the development of retinal infarction. A typical painless, sudden onset blurring of vision is often the presenting complaint. Average age at presentation of patients with retinal artery occlusion is the early to mid-60s. Younger patient (especially < 45) does warrant a systemic workout.

Embolitic and thrombotic cause account for 80% of arterial occlusion disease.¹ Inflammation in or around the vessel wall (e.g. giant cell arteritis–GCA, systemic lupus erythematosus, Wegener granulomatosis, polyarteritis nodosa), vasospasm (e.g. migraine) and systemic hypotension causes the minority of the cases. Emboli can be refractile yellow-white cholesterol (Hollenhorst) plaques, greyish elongated fibrin-platelet aggregates, non-scintillating white calcific particles and rarely vegetations from bacterial endocarditis, cardiac myxomatous material, fat and others.²

The hallmark on clinical examination is retinal whitening representing ischemia of the area affected, although in our case, the emboli was not clearly visible. Further systemic workout revealed hyperlipidaemia and

no other sources of emboli (such as from heart or carotid artery) was found. With the history of chronic smoking, hyperlipidaemia, and demographic of the patient (middle age male), blood investigation to rule out antiphospholipid was not required.

Cilioretinal artery (which present in 15-50% of population) occlusion otherwise usually carry fairly good visual prognosis unless the foveola is completely surrounded by retinal whitening.² The general idea of management is to establish reperfusion of the ischaemic retina either mechanically or medically to dislodge the embolic (if it is the likely cause). Adoption of supine posture, ocular massage, anterior chamber paracentesis and ocular pressure lowering agent is typically employed to achieve the above mentioned effect. Rebreathing bag is another non-invasive method that is often used, and some also promote use of carbogen (mixture of high oxygen 95%, carbon dioxide 5%) to achieve vasodilatation effect and hope to dislodge the emboli. In this case, we employed ocular massage, applying self-rebreathing bag and also anterior chamber paracentesis methods.

The duration of retinal ischemia is the most important factor in determining prognosis. However, since it is often difficult to pinpoint the actual initial occlusive event, aggressive management is appropriate, particularly in patients with a duration of occlusion less than 24 hours.

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