Paediatric cataract surgery in Hospital Kuala Lumpur - A 5-year review of visual outcomes

Fiona LM Chew, MS Ophthal[1], Suriya Eh Qurut, MD[2], Izzaifa Hassan, MBBch[2], Lim See Theng, MD[2], Sunder Ramasamy, FRCS[2], Jamalia Rahmat, MS Ophthal[2]

[1]Department of Ophthalmology, Hospital Selayang, Selangor, Malaysia, [2]Department of Ophthalmology, Hospital Kuala Lumpur, Kuala Lumpur, Malaysia

ABSTRACT

Introduction: Paediatric cataract surgery is challenging with reported post-operative visual acuity (VA) of 0.3LogMar or better varying between 33% to 68% of patients. OBJECTIVE: The aim is to document the post-operative refraction, VA and complications of non-traumatic pediatric cataract surgery performed in a tertiary referral center in Malaysia.

Methodology: This retrospective study reviewed case notes of all consecutive patients aged 12 years and below who underwent cataract surgery from January 2010 to December 2015. Patients were recruited if they had a minimum of six months post-operative follow-up. Exclusion criteria included traumatic cataract, central nervous system abnormalities, incomplete medical records or pre-existing ocular pathology. Subjects were divided into two groups based on refraction at one month. Subjects with refraction within 1-dioptre of the targeted spherical equivalent were in the success group and the rest were in the failure group.

Results: A total of 111 subjects were recruited (65 subjects in success group and 46 subjects in the failure group). Mean age at surgery was 33.14 (SD: 33.47) months. The success group had significantly longer axial length (p:0.0045, CI: 0.566-0.994, OR: 0.750). At final review, 44.1%(49/111) subjects had visual acuity of 0.3LogMar or better. The success group had better final mean VA in comparison to the failure group (p:0.034, CI:1.079-7.224, OR: 2.791).

Conclusion: The outcome of non-traumatic paediatric cataract surgery was acceptable with 58.6% achieved targeted refractive correction at 1-month post-operative period. Longer axial length was associated with better refractive outcome. Capsule related complications was the most common intra-operative complication.

KEY WORDS:
Pediatric cataract, congenital cataract, children, visual outcome; cataract surgery

INTRODUCTION

Paediatric cataract is an important cause of visual impairment in children. Overall prevalence ranges from 0.32 to 0.63 per 10000 children.[1] The causes of paediatric cataract are varied ranging from hereditary, idiopathic, ocular anomalies, multisystem syndromes, metabolic disorders, maternal infection, toxic effect of medication and trauma.[2] Paediatric cataract surgery is different compared to adult cataract surgery. Specific challenges include the smaller-sized eye, which may prevent intraocular lens (IOL) implantation, low scleral rigidity (increases wound leak), a more elastic lens capsule and rapidly changing axial length, which leads to difficulties in calculating IOL power.[3] The paediatric eye also has excessive post-surgical inflammation, which increases the rate of posterior capsule opacification (PCO) and high risk of amblyopia due to patient compliance to visual rehabilitation post-operatively.[3]

The Infant Aphakia Treatment Study recommended that infants aged seven months or less be left aphakic while the suggested minimal age for intraocular lens (IOL) implantation was 1 to 2 years of age.[4,5] There is also no consensus regarding the ideal timing for surgery and the optimum post-operative targeted refraction. Reported visual outcomes vary from as low as 33% to 68% of patients achieving a visual acuity (VA) of 0.3LogMar or better.[6,8] In Malaysia, it is reported that 34.48% of patients with traumatic paediatric cataract achieved post-operative VA of 0.3LogMar or better.[9] To the best of our knowledge, there is no study published documenting the visual outcome of paediatric non-traumatic cataract in Malaysia.

This study aims to document the visual outcomes in terms of post-operative refraction, VA and complications of non-traumatic paediatric cataract surgery performed in a tertiary referral centre in Malaysia.

MATERIALS AND METHOD

This study was conducted in Hospital Kuala Lumpur (HKL), Malaysia from October 2016 to December 2016. Institutional Review Board (IRB)/Ethics Committee approval was obtained from the Medical Research and Ethics Committee of the Malaysian Ministry of Health (NMRR ID NMRR-16-1672-32465). The study and data collection was conducted in accordance to the Declaration of Helsinki for human research. Medical records of all consecutive patients aged 12 years and below who underwent cataract surgery from January 2010 to December 2015 in HKL were reviewed. Visually significant paediatric cataract in this study was defined as central lens opacities measuring 3mm or more in diameter which resulted in a poor red reflex in the undilated eye. Classification of cataract was according to classification

This article was accepted: 13 November 2018
Corresponding Author: Dr Fiona Chew Lee Min
Email: sabrefmin@gmail.com

previously reported by Ellis et al.[10] Patients who have undergone primary cataract surgery with minimum of six months post-operative follow-up were recruited. Patients with traumatic cataract, central nervous system abnormalities, incomplete medical records or pre-existing ocular pathology such as glaucoma, corneal or retinal diseases were excluded. Incomplete medical records were defined as patients who had any missing data (demographic data, ocular examination results, operative details and post-operative ocular findings). Demographic data collected included subjects' age, gender and ethnicity. Subjects' past medical conditions and ocular disorders were noted. Ocular details such as cataract laterality, type and cause of cataract and pre-operative visual acuity (VA) and axial length were recorded. Axial length was defined as normal (22-25mm), short (less than 22mm) and long (more than 25mm).[11] Intra-operative findings and post-operative ocular findings were documented. Post-operative ocular findings included VA, refractive status, presence of amblyopia or strabismus, other ocular findings and post-operative complications. Data from the affected eye was used for analysis. If bilateral eyes were eligible for recruitment, only the right eye was selected for analysis. Subjects were divided into two groups based on refraction at one month. Subjects in the success group had refraction within one dioptre of targeted spherical equivalent. Subjects which did not fit the success group criteria were placed in the failure group.

Surgical technique and post-operative management

The surgeries were performed by four surgeons (FCLM, JR, SR, JA) using a standardized technique. All subjects had corneal incisions, anterior capsulorrhexis and lens aspiration. Patients younger than seven years old had posterior capsulorrhexis and anterior vitrectomy (Accurus, Alcon, Fort Worth, Texas, USA). A single-piece, acrylic, hydrophobic intraocular lens (IOL) (SA60AT, Alcon, Fort Worth, Texas,USA) was implanted for all patients who had a corneal diameter of 9.5mm or greater. Keratometric readings (Nidek KM-500, Gamagori, Aichi, Japan) and indentation biometry (Tomey, Nishi-ku, Nagoya, Japan) was performed. SRK-T was used to calculate the intraocular lens power. Targeted post-refraction was as stated below:

Age	Targeted post-op refraction
Less than one year old	+8.00DS
1 year	+6.00DS
2 years	+4.00DS
3 years	+3.00DS
4 years	+2.00DS
5 years	+1.00DS
6 years and above	Plano

All corneal incisions were sutured with vicryl 10/0 and subconjunctival dexamethasone 2mg was injected at the end of the surgery. Post-operatively, subjects were given 2-hourly dexamethasone and moxifloxacin eye drops, which were tapered off over a two-month period. At each post-operative visit, all subjects had refraction and examination of the anterior and posterior segment of the eye (inclusive of intraocular pressure). Appropriate refractive correction such as bifocal, aphakic glasses or contact lens (for unilateral cataracts) were prescribed for all subjects two weeks post-operatively. Patching therapy of two hours per day for unilateral cataracts was instituted if necessary.

Statistics:

SPSS version 13 (SPSS Statistics: Windows Student Version 13, Chicago, Illinois,) was used to analyse the data collected. Independent samples t-test was used to compare means and categorical data was analysed using Pearson Chi-squared tests. Multiple logistic regression was used to calculate odds ratios and confidence intervals. A p-value of less than 0.05 was taken as statistically significant.

RESULTS

A total of 158 records were reviewed and 47 patients were excluded as they had traumatic cataract (23 patients), incomplete follow-up (four patients), pre-existing ocular pathology (13 patients) and central nervous system abnormalities (seven patients). A final number of 111 subjects were recruited where 65 subjects were in the success group and 46 subjects were in the failure group. The mean age at time of diagnosis was 29.97(SD: 32.49) months. At surgery, most subjects (61.3%, 68/111) were aged one year and below. The mean age at surgery was 33.14(SD: 33.47) months. Males represented 55% (61/111) of subjects. Ethnic distribution was Malays (78.4%, 87/111,), followed by Indian (10.8%, 12/111), Chinese (8.1%, 9/111) and Orang Asli (2.7%, 3/111). Majority of the subjects (79.3%, 88/111) did not have medical illness. Of the 23 patients with medical illness, 60.9% (14/23) had Down syndrome, 30.4% (7/23) had asthma and 0.09%(2/23) had nephrotic syndrome.

Bilateral cataracts were found in 63.1% (70/111) subjects. Congenital cataract represented 78.4%(87/111) of the cataracts. Most cataracts were dense cataracts (36.9%, 41/111), followed by nuclear (26.1%, 29/111), lamellar (18.0%, 20/111), polar (12.6%, 14/111) and other cataracts types (6.3%, 7/111). Pre-operative mean VA was 1.6 (SD: 1.07) LogMar units. No significant difference was noted between the pre-operative characteristics of both groups except for mean axial length. Axial length ranged from 17.41mm to 29.2mm with a mean of 21.32(SD: 2.33) mm. Most subjects (68.5%, 76/111) had axial length of less than 22mm while subjects with axial length longer than 26mm represented 3.6% (4/111).

Subjects in the success group had significantly longer axial length (p:0.0045, CI: 0.566-0.994, OR: 0.750) (Table I) Strabismus was noted in 0.05% (6/111) subjects where two subjects had esotropia and 4 subjects had exotropia. Nystagmus was documented in 0.09%(10 /111) subjects.

Intra-operative complications were noted in 17% (19/111) subjects. All complications were lens capsule related where 89.4% (17/19) subjects had extension of the anterior capsule capsulorrhexis and 10.6% (2/19) subjects had extension of the primary posterior capsulorrhexis. IOL was implanted in the capsular bag for 94.6% (105/111) subjects. Target refraction ranged from -0.93 to 8.00D with a mean of 3.34 (SD: 2.51). Most subjects (88.3%, 98/111) had a hypermetropic target refraction. (Table II)

The mean duration of follow-up was 29.71 (SD: 18.78) months with follow-up attendance of 82%, 60.4%, 41.4%, 27% and 16.2% for one, two, three, four and five-year follow-up respectively. At one-month review, 58.6% (65/111)

Table I: Pre-operative Profile of Study Subjects

	Success	Failure	p
Mean age at surgery (months)	40.08(SD: 33.79)	23.35(SD: 30.77)	0.585
Gender			
Male	34	27	0.505
Female	31	19	
Ethnicity			
Malay	55	32	0.058
Other	10	14	
Medical illness			
Yes	19	18	0.276
No	46	28	
Cataract cause			
Congenital	45	42	0.424*
Developmental	20	4	
Cataract type			
Dense	23	18	0.687
Other	42	28	
Mean VA (LogMar)	1.42(SD: 1.04)	1.87(SD: 1.08)	0.166
Mean axial length (mm)	21.91(SD: 2.54)	20.44(SD: 1.64)	0.005*
Axial length group			
Normal (22-25mm)	23	8	0.017
Abnormal (< 22 or ≥ 25mm)	42	38	
Laterality			
Unilateral	20	21	0.108
Bilateral	45	25	

SD= standard deviation, * =multiple logistic regression

Table II: Intra-operative Details

	Success	Failure	p
IOL placement			
Yes: No	61:4	44:2	0.678
Primary posterior capsulectomy and anterior vitrectomy			
Yes: No	57:8	43:3	0.315
Intra-operative Complication			
Yes: No	9:56	10:36	0.277
Mean target refraction (Diopters)	3.04(SD: 2.66)	3.77(SD: 2.25)	0.144

IOL= intraocular lens

subjects achieved spherical equivalent of within 1.0D of targeted refraction. This reduced to 57.5% (64/111) at 6 months post-operatively. Final mean spherical equivalent was 0.99D (SD: 4.02). At final review, the mean visual acuity was 0.52(SD: 0.47) LogMar, and 44.1%(49/111) subjects had visual acuity of 0.3LogMar or better. The percentage of subjects with VA 1.0LogMar or worse was 17.1%(19/111). No significant post-operative differences were noted in both groups except for final VA. The success group had significantly better final mean VA in comparison to the failure group (OR: 2.791, 95%CI: 1.079-7.224,). It was also noted that more subjects in the success group had final VA of better than 0.3Logmar units (OR: 2.27, 95%CI: 1.033-4.972,).

Spectacle correction was prescribed in 97.3% (108/111) subjects and 64.9% (72/111) subjects were reported to be compliant to refractive correction prescribed. A total of 77.5% (86/111) subjects had amblyopia at final review. No cases of endophthalmitis or secondary glaucoma were reported at final follow-up. Posterior capsule opacification (PCO) requiring surgical intervention was present in 17.1% (19/111) of cases. Most subjects (82.9%, 92/111) did not require additional surgery after cataract surgery (Table III). At final review, 24.3% (27/111) subjects were noted to have strabismus with 77.8%(21/27) having esotropia and 22.2%(6/27) having exotropia.

Table III: Post-operative Findings of Study Subjects

	Success(n=65)	Failure(n=46)	p
Follow-up (months)	32.10(SD: 18.96)	26.47(SD: 18.24)	0.128
Final Spherical Equivalent	0.77(SD: 4.09)	1.30(SD: 3.94)	0.496
Mean Final VA (LogMar)	0.44(SD: 0.35)	0.64(SD: 0.58)	0.035*
Final VA(LogMar)			
0.3 or better	33	15	0.039*
Worse than 0.3	31	31	
Compliance to refractive correction			
Yes	44	28	0.458
No	21	18	
Amblyopia			
Yes	48	38	0.276
No	17	8	
Additional surgery			
Yes	7	8	0.315
No	58	38	
Posterior capsule opacification			
Yes	9	10	0.277
No	56	36	

VA=visual acuity, *=multiple logistic regression

DISCUSSION

The population of Malaysia was estimated to be 30.949 million people with 28.16% of the population aged 14 years and below.[12] Lens-related pathologies was reported to contribute 17.2% of blindness or severe visual impairment of Malaysian children aged 15 years and below.[13] Our study had fairly equal gender distribution in contrast to other Asian studies, which reported girls having less access to cataract surgery.[14,15]

The majority of our subjects had bilateral cataract. This was consistent with previously reported literature.[16] We chose to use post-operative refraction at one month as our outcome parameter as it was an objective measurement compared to visual acuity. Visual acuity in children would also be dependent on the child's attention span and cooperation.

Our subjects' mean axial length was slightly longer that previously reported literature.[17] This could be due to differences of ethnicity, as our population comprised of mainly Malay subjects. We also noted that the success group had significantly longer axial length. This corresponded to Dong J et al.'s study who reported that eyes with normal and long axial lengths had less intraocular lens power calculation variability during biometry compared to eyes with axial length of less than 22mm.[11]

All intra-operative complications were lens capsule-related. This was because the low scleral rigidity and enhanced elasticity of the paediatric lens capsule increased the risk of capsulorrhexis extension. In contrast to other studies which only implanted IOL after the age of two years, IOL was implanted regardless of age as long as the corneal diameter was 9.5mm and above.[18] This was to facilitate visual rehabilitation of the patient and we also believed early IOL implantation would decrease the risk of glaucoma by reducing vitreous contact with the trabecular meshwork. This theory was supported as no reported cases of secondary glaucoma were noted in our study. Previous studies reported follow-up attendance ranging from 20.6% to 96% at post-operative visits with a decreasing trend as the follow-up period lengthened.[19,20] Our post-operative follow-up attendance was consistent with these studies and highlighted the need to increase awareness for patients to have consistent post-operative follow-up to successfully treat amblyopia.

We noted better final VA in our subjects compared to the IATS study which reported 49.1% of subjects having VA of 20/200 or worse and 16.96% subjects achieving VA of better than 20/40.[4]

This may be due to the differences of age at surgery and possibly better compliance to visual rehabilitation as we implanted IOL in most subjects.

SRK T formula was chosen as no IOL calculation formula has been shown to be superior to others for predicting lens power in the paediatric cataract population.[6] Our study findings of 58.6% subjects achieving targeted spherical power within 1.0D at one month, concurred with Repka et al., who reported a prediction error of <1.00D in 54% eyes.[21] This figure decreased to 57.5% at six months most likely due to the process of ocular emmetropization. Our PCO rate of 17.1%, though consistent with reported studies which reported PCO rate of 6.90% to 26.86%, was on the slightly higher side.[22,23] This was because more than half of our subjects were aged 1 year and below and this predisposed them to higher risk of PCO from post-operative inflammation despite having a primary posterior capsulectomy at the first surgery.

Post-operatively, we noted subjects with esotropia increased from 1.8% (2/111) pre-operatively to 18.91% (21/111) post-operatively. This was because we aimed for hypermetropic correction in most patients in anticipation of emmetropization and to reduce anticipated future myopic shift.[24] Our study subjects however were found to have less strabismus at final review compared to the IATS study, which noted 81% of subjects having strabismus.[25] This may be due to ethnic variation and better final visual acuity, which could improve subjects' fixation and improve strabismus control.

Limitations of our study were that it had multiple surgeons, was retrospective in nature, grading of cataract was according to documented notes and stereopsis testing was not routinely done for subjects. Our study is still relevant as it is the first to report the visual outcomes of non-traumatic paediatric cataract surgery in Malaysia. Also, our results may be representative of the Malaysian paediatric population as HKL is the national referral centre for paediatric ophthalmology.

CONCLUSION

Post-operative refraction and final visual acuity of non-traumatic paediatric cataract surgery in Malaysia are comparable to reported literature with 58.6% of subjects achieving targeted refractive correction at one month post-operatively. Longer axial length was associated with better refractive outcome. Capsule-related complications were documented as the most common intra-operative complication. Room for improvement to enhance visual outcomes for paediatric cataract surgery still exists and further efforts are required to improve post-operative follow-up attendance to ensure successful visual rehabilitation.

ACKNOWLEDGEMENT

The authors would like to thank the Director General of the Ministry of Health Malaysia for his kind permission to publish this article. The authors would like to acknowledge the guidance and teaching of the late Dr. Joseph Vijaya Alagaratnam, whose endless support has made it possible for this research to be carried out.

REFERENCES

1. Sheeladevi S, Lawrenson JG, Fielder AR, Suttle CM. Global prevalence of childhood cataract: a systematic review. Eye 2016; 30(9): 1160-9.
2. Liu YC, Wilkins M, Kim T, Malyugin B, Mehta JS. Cataracts. Lancet 2017; 390(10094): 600-12.
3. Medsinge A, Nischal KK. Pediatric cataract: challenges and future directions. Clin Ophthalmol 2015; 9: 77-90.
4. Lambert SR, Lynn MJ, Hartmann EE et al. Infant Aphakia Treatment Study Group. Comparison of contact lens and intraocular lens correction of monocular aphakia during infancy: a randomized clinical trial of HOTV optotype acuity at age 4.5 years and clinical findings at age 5 years. JAMA Ophthalmol 2014; 132(6): 676-82.
5. Shamrani MA, Turkmani SA. Update of intraocular lens implantation in children. Saudi Journal of Ophthalmology 2012; 26(3): 271-5.
6. Lim ME, Buckley EG, Prakalapakorn SG. Update on congenital cataract surgery management. Curr Opin Ophthalmol 2017; 28(1): 87-92.
7. Negretti GS, Chir B, Ayoub T, Deb R, Majumder U, Jewel J et al. Cataract surgery outcomes in Bangladeshi children. Ophthalmology 2015; 122(5): 882-7.
8. Ledoux DM, Trivedi RH, Wilson ME Jr, Payne JF. Paediatric cataract extraction with intraocular lens implantation: visual acuity outcome when measured at age four years and older. J AAPOS 2007;11(3): 218-24.
9. Adlina AR, Chong YJ, Shatriah I. Clinical profile and visual outcome of traumatic paediatric cataract in suburban Malaysia: a ten-year experience. Singapore Med J 2014; 55(5): 253-6.
10. Ellis FJ. Management of pediatric cataract and lens opacities. Curr Opin Ophthalmol 2002; 13(1): 33-7.
11. Dong J, Zhang Y, Zhang H, Jia Z, Zhang S, Wang X. Comparison of axial length, anterior chamber depth and intraocular lens power between IOLMaster and ultrasound in normal, long and short eyes. PLoS ONE 2018; e0194273.
12. Malaysia Demographic Profile 2016 [cited Feb 2017] Available at: http://www.indexmundi.com/malaysia/demographics_profile.html.
13. Patel DK, Iqbal T, Gilbert C and Subrayan V. Childhood blindness and severe visual impairment in Malaysia: a nationwide study. Eye 2011; 25(4): 436-42.
14. Gilbert CE, Lepvrier-Chomette N. Gender inequalities in surgery for bilateral cataract among children in low-income countries. a systematic review. Ophthalmology 2016; 123(6): 1245-1251.
15. Lin D, Chen J, Lin Z, Li X, Wu X, Long E et al. 10-Year Overview of the Hospital-Based Prevalence and Treatment of Congenital Cataracts: The CCPMOH Experience. PLoS ONE 2015; 10 (11): e0142298.
16. Rajavi Z, Mokhtari S, Hamideh Sabbaghi H, Yaseri M. Long-term visual outcome of congenital cataract at a tertiary referral center from 2004 to 2014. J Current Ophthalmol 2015; 27(3-4): 103-9.
17. Prado RBD, Silva VF, Schellini SA, Rodrigues ACL. Congenital and developmental cataract: axial length and keratometry study in Brazilian children. Arq Bras Oftalmol 2016; 79(1): 19-23.
18. Nagamoto T, Oshika T, Fujikado T, Ishibashi T, Sato M, Kondo M et al. A survey of the surgical treatment of congenital and developmental cataracts in Japan. Jpn J Ophthalmol 2015; 59(4): 203-8.
19. Gogate P, Patil S, Kulkarni A, Mahadik A, Tamboli R, Mane R et al. Barriers to follow-up for pediatric cataract surgery in Maharashtra, India: How regular follow-up is important for good outcome. The Miraj Pediatric Cataract Study II. Indian J Ophthalmol 2014; 62(3): 327-32.
20. Rai SKC, Thapa H, Kandel R, Ishaq M, Bassett K. Clinical and cost impact of a pediatric cataract follow-up program in western Nepal and adjacent northern Indian States. J AAPOS 2014; 18(1): 67-70.
21. Repka MX, Dean TW, Lazar EL. Cataract Surgery in Children from Birth to Less than 13 Years of Age. Baseline Characteristics of the Cohort. Ophthalmology 2016; 123(12): 2462-73.
22. Trivedi RH, Wilson ME. Posterior capsule opacification in pediatric eyes with and without traumatic cataract. J Cataract Refract Surg 2015; 41(7):1461-4.
23. Solebo AL, Russell-Eggitt I, Cumberland PM, Rahi JS; British Isles Congenital Cataract Interest Group. Risks and outcomes associated with primary intraocular lens implantation in children under 2 years of age: the IoLunder2 cohort study. Br J Ophthalmol 2015; 99(11): 1471-6.
24. Fan DS, Rao SK, Yu CB, Wong CY, Lam DS. Changes in refraction and ocular dimensions after cataract surgery and primary intraocular lens implantation in infants. J Cataract Refract Surg 2006; 32(7):1104-8.
25. Bothun ED, Lynn MJ, Christiansen SP, Neely DE, Vanderveen DK, Kruger SJ et al. Sensorimotor outcomes by age 5 years after monocular cataract surgery in the Infant Aphakia Treatment Study (IATS). J AAPOS 2016; 20(1): 49-53.

ORIGINAL ARTICLE

Detection rate of colonic polyp among patients who had undergone colonoscopy at gastroenterology unit of Serdang Hospital, Malaysia

Tan Yi Jun, MRCP[1], Wendy Tan, MRCP[1], Chieng JinYu, FRCP[2]

[1]Medical Department, Hospital Serdang, Selangor, Malaysia, [2]Medical Department, Faculty of Medicine and Health Sciences, Putra University of Malaysia, Selangor, Malaysia

ABSTRACT

Objective: The aim of this study was to evaluate the demography, and to determine the detection rate of polyps, and detection rate of adenoma at a Malaysian tertiary hospital.

Methods: This is a retrospective study of all the patients who had undergone colonoscopy at Gastroenterology endoscopy unit, Serdang Hospital from 1st January 2010 to 31st December 2016. Patients who had a history of colorectal cancer, polyp or inflammatory bowel disease were excluded. Data collected which included patients' demography, indication for colonoscopy, colonoscopy finding, and histopathology results. Data was analysed with SPSS version 16.

Results: Among the 559 patients who had fulfilled the inclusion criteria (68 males, 44 females), 112 patients were found to have at least one polyp giving the polyp detection rate (PDR) of 20% and 168 polypectomies were performed. The PDR among male patients was higher than that of females (22.5% vs 17.1%, p<0.05). The detection rate of polyp was nearly equal in Malays, Chinese, Indians, and Others. The polyps were more common in those of age 40 years old and above (p<0.05), with the mean age of 63.0±1.5 years. The commonest morphology of polyp in our patients was sessile (58%) and majority was medium size (5-9mm). Otherwise, the polyps were commonly found in the distal colon those that in proximal colon (55.3% vs 38.7%, p<0.05). The adenoma detection rate (ADR) was 19.1% (107/559).

Conclusion: The detection rate of colonic polyp from colonoscopy is 20% in our centre.

KEY WORDS:
Colorectal cancer, colonoscopy, screening, Malaysia, polyp detection

INTRODUCTION

Colorectal cancer (CRC) remains as one the most common form of gastrointestinal cancer around the world. The number of cases of colon cancer has been on the rise in Asian countries over the past few years.[1] In Malaysia, CRC is the second most common cancer in males and third most common cancer in females.[2] The increasing number of cases has directly increased with the economic burden in regard to direct medical care and non-medical cost. It has been estimated that the cost of management of new cases of CRC could reach up to MYR108 millon per year.[3]

In fact, it is the fourth leading cause of mortality in the world and has account for 8-12% of mortality in the world with estimated 1.4 million new cases a year.[4] Most colorectal carcinoma arises from the progression of adenoma from small to large polyps and then to dysplasia and carcinoma. On average, it takes at least 10 years for this progression.[5] Given that the slow and long duration in the process of conversion of colorectal adenomas into adenocarcinoma, early detection and colonoscopic removal of these precancerous polyps are very effective in reducing the incidence and mortality rate of CRC in long run.[6]

Recent studies have shown that endoscopic procedures of the colon could half the risk of developing colorectal carcinoma and its protective benefit could last as long as six years.[7] The ASGE/ACG taskforce on quality in endoscopy have recommended that adenoma detection rates of 15% or higher for female patients and 25% or higher for male patients as indicators of adequate colonoscopy quality.[8]

METHODS

This is a retrospective cross section study of all patients who had undergone colonoscopy at the Gastroenterology Endoscopy Unit (GEU), Serdang Hospital from the 1st January 2010 to 31st December 2016. The records of the patients were traced from Hospital Information System (EHIS). Data such as patient gender, age, ethnicity, indication for colonoscopy, colonoscopic finding and complication, histopathology finding of polyps were extracted and further analysed. The analysis was done using EXCEL and SPSS for Windows version 16.0. Categorical variables are expressed as numbers and percentages. χ^2 or Fisher's exact test, where appropriate, was used for analysis of categorical variables. A two-tailed p<0.05was considered statistically significant.

Patients included in the study were those with follow up at own Gastroenterology and Hepatology Clinic, Serdang Hospital, and patients who were internally referred from

This article was accepted: 7 November 2018
Corresponding Author: Dr Jin Yu Chieng
Email: cjy511@yahoo.com

Table I: Characteristics of the patients whom have undergone Colonoscopy

Variable	n(%), total 559
Gender	
Male	302(54.0%)
Female	257(46.0%)
Ethnicity	
Malay	238(42.6%)
Chinese	224(40.1%)
Indian	79(14.1%)
Others	18 (3.2%)
Age group	
<20	19 (3.4%)
20-39	78 (14.0%)
40-59	167 (29.9%)
60-79	281 (50.2%)
>80	14 (2.5%)
Indications of screening	
CRC screening	157(28.1%)
Anaemia	208(37.2%)
Chronic constipation	49 (8.8%)
Chronic diarrhea	75(13.4%)
PR Bleed	40 (7.1%)
Others (abdominal pain, Unexplained weight loss)	30 (5.4%)

Table III: Characteristic of polyps

Variable	n(%), total 168	P value
Size		
Small (<5mm)	50(29.7%)	
Medium (5 – 9 mm)	70(41.7%)	
Large (>10mm)	48(28.6%)	
Morphology		
Pedunculated	62(36.9%)	
Sessile	97(57.7%)	
Circumferential	9(5.4%)	
Histopathology		
Non-adenoma/Hyperplastic	30 (17.9%)	
Adenoma (Total)	107 (63.7%)	
- Tubular	52	
- Tubulovillous	48	
- Villous	7	
Serrated	7 (4.2%)	
Juvenile	3 (1.8%)	
Adenocarcinoma	13 (7.7%)	
Inflammatory	8 (4.7%)	
Location		
Caecum	21 (12.5%)	
Ascending colon	22 (13.1%)	
Transverse colon	22 (13.1%)	Distal colon
Descending colon	40 (23.8%)	vs Proximal colon
Sigmoid colon	32 (19.0%)	55.3% vs 38.7%,
Rectum	21(12.5%)	p<0.05
Entire Colon	10 (6.0%)	

other departments such as General Medical Department, General Surgical Department, and referrals from local district hospitals and clinics. All the colonoscopies were performed by our three qualified gastroenterologists, with sedation of midazolam and fentanyl. Informed consents were obtained

Table II: Detection Rate of Polyps according to Gender/Ethnicity/Age group

Variable	n(%)	P value
PDR	112/559(20.0%)	
Gender		p<0.05
Male	68/302(22.5%)	
Female	44/257(17.1%)	
Ethnicity		p<0.05
Malay	47/238(19.7%)	
Chinese	45/224(20.1%)	
Indian	18/79(22.8%)	
Others	2/18(11.1%)	
Age group		p<0.05
<20	2/19 (10.5%)	
20-39	10/78 (12.8%)	
40-59	36/167 (21.6%)	
60-79	60/281(21.3%)	
>80	4/14 (28.6%)	
<40	12/97 (12.4%)	
40 years old and above	100/462 (21.6%)	

prior the colonoscopy. The average withdrawal time during colonoscopies was at least six minutes. Only those with complete colonoscopy (successful caecal intubation) were included in this study. Indications for colonoscopy included CRC screening, anaemia, chronic constipation, chronic diarrhoea, per rectal bleeding, and others (persistent abdominal pain, unexplained weight loss). Those who had colonic polyps were further analysed according to the polyp's size (small, medium, and large), morphology (pedunculated, sessile, circumferential), histopathology (non-adenoma/hyperplastic, adenoma, serrated, juvenile, adenocarcinoma, and inflammatory), and location (proximal colon including caecum, ascending colon and transverse colon; distal colon including descending colon, sigmoid colon and rectum; and entire colon). We have looked into complications of colonoscopy including post polypectomy bleeding, complications from over sedation and bowel perforation.

Both Polyp Detection Rate (PDR) and Adenoma Detection Rate (ADR) were accounted. The PDR was defined as the proportion of procedures in which at least one polyp was found over the total number of colonoscopies. ADR was defined as the number of colonoscopies in which at least one adenoma was found, divided by the total number of colonoscopies performed.

Patients who were excluded from our study either had incomplete colonoscopy (caecal intubation was not achieved during the colonoscopy due to poor bowel preparation, looping, pain intolerance, prior surgery with adhesions and altered anatomy), or incomplete data, or those who had polyps/Colorectal cancer/Inflammatory bowel disease/colonic resection before or repeated colonoscopy for previous incomplete colonoscopy.

This study was registered in accordance with the National Medical Research Register Malaysia (NMRR-17-2494-37735 (IIR).

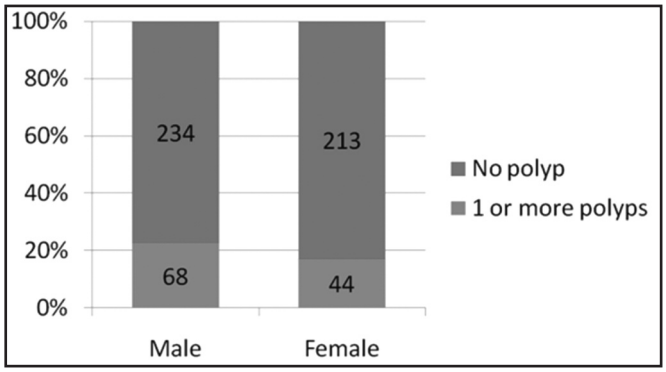

Fig. 1: Detection Rate of Polyps According to Gender.

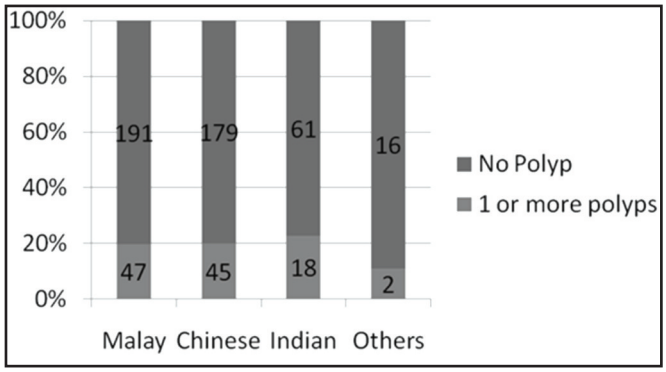

Fig. 2: Detection Rate of Polyps According to Ethinicity.

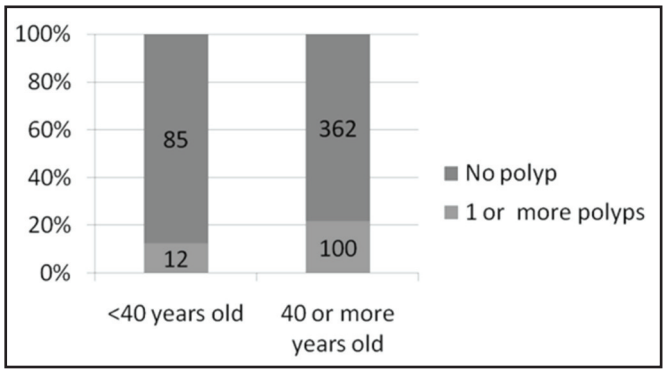

Fig. 3: Detection Rate of Polyps according to Age Group.

RESULTS

A total of 725 colonoscopies were performed at our GEU with 92% (669/725) of successful caecal intubation rate. However, only 559 of them (77.0%) were recruited to our study. Distributions of male and female subjects was 54% and 46% respectively. The ethnicity distribution of our patients was Malays (42.6%), Chinese (40.1%), Indians (14.1%) and others (3.2%). Their ages were between age 60-79 years. Anaemia was the most common indication for colonoscopy (37.2%). The characteristics of the patients in this study is summarized in Table I.

Among the 559 patients, a total of 112 patients were found to have at least one polyp. The overall estimate of PDR was 20.0% (112/559), with 168 polypectomies performed. The PDR among the male patients was significantly higher than that of female patients (22.5% vs 17.1%, $p<0.05$) as shown in Fig 1. Detection rate of polyps among the ethnicity were nearly equal (Malay - 19.7%, Chinese - 20.1%, Indian - 22.8%, $p<0.05$) as shown in Table II. Polyps were more commonly detected in those age 40 years old and above (age less than 40 years old 12.4%, Age 40 years old and above 21.6%, $p<0.05$) as shown in Fig 2. The mean age of patients with polyp was 63.0±1.5 years. We found that the commonest morphology of polyp in the patients was sessile (57.7%) and the majority (41.7%) were medium size (5-9mm). Three patients had multiple polyposis coli over entire large bowel. Otherwise, the prevalence of polyps in distal colon was higher than that in proximal colon (55.3% vs 38.7%, $p<0.05$). Majority of the polyps were located in the recto sigmoid region (31.5%) followed by descending colon (23.8%), ascending (13.1%), transverse colon (13.1%) and caecum 12.5%.

The ADR in this study was 19.1% (107/559). 63.7% of the polyps detected were adenomas which consist of tubular 48.6%, tubulovillous 44.9% and villous 6.5%. (Table III). This was followed by non-adenoma/hyperplastic 17.9%, adenocarcinoma 7.7%, inflammatory 4.8%, serrated 4.2% and juvenile 1.8%.

Only two patients (0.3%) developed complications from colonoscopies, one developed side effect of sedation which required intubation, and another developed bleeding post polypectomy which was treated endoscopically. No mortality was reported during colonoscopy procedures.

DISCUSSION

Based on the colonoscopies findings, our overall estimate for PDR was 20.0% while ADR was 19.1%. The PDR was similar to reports from the Middle East.[9-11] However, the PDR and ADR rates in this study was comparatively low when compared with figures from Western and some East Asian Countries.[12-18] Compared to African countries (PDR, 16.1%; ADR, 6.8%), both of our PDR and ADR rates were reported to be higher.[19]

We inferred from our study that male gender and older age were the strong indicators for occurrence detection of colonic polyp.

Male gender was believed to have a higher impact on prevalence of either colonic polyp or CRC. Moreover, it was detected that advanced neoplasia was at a significantly higher rate in men than in women, which may warrant refinement of the screening recommendations for CRC.[20,21] This could be explained by the lifestyle, especially red meat intake and smoking habit, which were very common among males. Woman on the other hand perhaps had hormonal changes and some may even be on contraceptives or hormonal pills which somehow protect them from the risk of colonic polyp or CRC.[22]

Age was another strong risk factor for colonic polyp or CRC, and older age is the most important predictor for the prevalence of adenomas and cancer. In our study, most of

our patients were in the age 40 years old and above, and 28.6% of those were more than 80 years old were found to have polyp during the colonoscopy. This finding was consistent with the literature where the increased prevalence of colonic polyp was with increasing age.[23]

Ethnic differences had been reported for colorectal polyps and large bowel cancer; although the supporting data was weak and inconclusive. Malaysia is a multiracial country consisting of Malays, Chinese, Indians and numerous indigenous people, and our patients' ethnicity distribution was Malays (42.6%), Chinese (40.1%), Indians (14.1%) and others (3.2%). Each ethnicity had its own religion, festivals, food and customs. However, we show that PDR in all the ethnicity was nearly equal being about 20%. This corresponded to a cross-sectional study among different racial patients among Asians attending for colonoscopy over a 41-month period in a private endoscopy centre and they had concluded that race did not appear to be an important factor.[24]

In our study, the vast majority of the polyps were found at distal colon located over recto sigmoid region (31.5%) followed by descending colon (23.8%). This correspond to other studies that showed that distal colon was more prone to develop polyps than proximal colon.[25-27] This could be further explained by the environmental factors that could potentially lead to the development of distal colon polyps or tumours such as diet, physical activity, smoking, history of cholecystectomy, chemoprophylaxis agents, reproductive and hormonal status.

The commonest histopathology of polyp in our patients was adenomas (62.5%), followed by hyperplastic (17.9%) and others (19.6%). Study shows that adenomatous polyps were the precursors of most CRC.[28] Our results were similar to National Polyp study, in which 66.5% of the polyps removed in 2362 patients were adenomatous.[29]

Majority (42%) of the polyps from our study was medium size (5-9mm). In fact, polyp size is an important biomarker that correlates with its risk of cancer and guides its clinical management.[30]

Retrospective study had its own weakness, that certain data, such as endoscopy withdrawal time, timing of the procedure, and bowel preparation were unable to be standardized. However, the retrospective design also was a strength on the opposite view, that it provided information in our actual clinical practice. It reduces the biases of highly controlled studies, in which the colonoscopy can be performed more diligently than during routine practice. This study was not population-based; therefore, our patients could have the bias in selection. Moreover, our samples included mostly symptomatic patients, in which the estimates may be different from screening studies with asymptomatic individuals. Family history was also not studied in this study due to unstandardized retrospective study.

CONCLUSION

In conclusion, the PDR was 20% and ADR is 19.1% in the Serdang Hospital . Gender and age were the most important predictors for the prevalence of adenomas while PDR in all the ethnicity were nearly equal.

ACKNOWLEDGEMENTS

We would like to thank all supporting staff from the Gastroenterology Endoscopy unit, Serdang Hospital for assistance in data collection and comments that greatly improved the manuscript. We would also like to thank the Director General of Health Malaysia his permission to publish this paper.

CONFLICT OF INTEREST

All authors declare no competing conflict of interest.

FINANCIAL DISCLOSURE

The authors declare that this study has received no financial support.

REFERENCES

1. Sung JJ, Lau JY, Goh KL, Leung WK, Asia Pacific Working Group on Colorectal Cancer. Increasing incidence of colorectal cancer in Asia: implications for screening. Lancet Oncology 2005; 6(11): 871-6.
2. Veetil SK, Lim KG, Nathorn C, Ching SM, Abu Hassan MR. Colorectal cancer in Malaysia: Its burden and implications for a multiethnic country. Asian J Surg 2017; 40(6): 481-9.
3. Natrah MS, Sharifa Ezat WP, Syed MA, Mohd AM, Saperi S, Ismail S et al. Economic evaluation of monoclonal antibody in the management of colorectal cancer in Malaysia. BMC Health Serv Res 2012; 12 (Suppl 1): 3.
4. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer 2015; 136(5): E359-86.
5. Winawer SJ, Fletcher RH, Miller L, Goodlee F, Stolar MH, Murlow CD et al. Colorectal cancer screening: clinical guideline and rationale. Gastroenterology1997; 112(2): 594-642.
6. Zauber AG1, Winawer SJ, O'Brien MJ, Lansdorp-Vogelaar I, van Ballegooijen M, Hankey BF et al. Colonoscopic polypectomy and long-term prevention of colorectal cancer deaths. N Engl J Med 2012; 366(8): 687-96.
7. Muller AD, Sonerberg A. Prevention of colorectal cancer by flexible endoscopy and polypectomy, a case-control study. Ann Intern Med 1995; 123(12): 904-10.
8. Rex DK, Petrini JL, Baron TH, Chak A, Cohen J, Deal SE. Quality indicators for colonoscopy. AM J Gastroenterol 2006; 101(4): 873-85.
9. Hamid AA, Ehsan NM, Sara Ashtari, Mohmad AP, Vahid C, Fakhrosadat A et al. Polyp detection rate and pathological features in patients undergoing a comprehensive colonoscopy screening. World J Gastrointest Pathophysiol 2017; 8(1): 3-10.
10. Al-Enezi SA, Alsurayei SA, Ismail AE, Aly NY, Ismail WA, Abou-Bakr AA. Adenomatous colorectal polyps in patients referred for colonoscopy in a regional hospital in Kuwait. Saudi J Gastroenterol 2010; 16(3): 188-93.
11. Ashktorab H, Brim H, Al-Riyami M, Date A, Al-Mawaly K, Kashoub M et al. Sporadic colon cancer: mismatch repair immunohistochemistry and microsatellite instability in Omani subjects. Dig Dis Sci. 2008; 53(10): 2723-31.
12. Nayagam S, Selvapatt N, Auguste JL, Williams HRT, Orchard TR, Thomas HJW et al. Quality of colonoscopic procedures among independently practising gastroenterology trainees in a NW London cohort: are they reaching national standards? Gut 2012; 61: A59-60.
13. Lucendo AJ, Guagnozzi D, Angueira T, González-CS, Fernández-FM, Friginal-RAB et al. The relationship between proximal and distal colonic adenomas: is screening sigmoidoscopy enough in the presence of a changing epidemiology? Eur J Gastroenterol Hepatol 2013; 25(8): 973-80.
14. Boroff ES, Gurudu SR, Hentz JG, Leighton JA, Ramirez FC. Polyp and adenoma detection rates in the proximal and distal colon. Am J Gastroenterol 2013; 108(6): 993-9.

15. Gao R, Corbett GD, Lee J, Sampaziotis F, Cameron E. Adenoma detection reduces during a colonoscopy list. Gut 2012; 61: A21.
16. Chung SJ, Kim YS, Yang SY, Song JH, Park MJ, Kim JS et al. Prevalence and risk of colorectal adenoma in asymptomatic Koreans aged 40-49 years undergoing screening colonoscopy. J Gastroenterol Hepatol 2010; 25(3): 519-25.
17. Kazuhiro K, Nagamu I, Toshifumi Y, Rieko B, Kazuaki Y, Hiroyuki I et al. Polyp detection rate in transverse and sigmoid colon significantly increases with longer withdrawal time during screening colonoscopy. PLoS ONE 2017; 12(3): e0174155.
18. Leung WK, Tang V, Lui PC. Detection rates of proximal or large serrated polyps in Chinese patients undergoing screening colonoscopy. J Dig Dis 2012; 13(9): 466-71.
19. Alatise OI, Arigbabu AO, Agbakwuru AE, Lawal OO, Sowande OA, Odujoko OO et al. Polyp prevalence at colonoscopy among Nigerians: A prospective observational study. Niger J Clin Pract 2014; 17(6): 756-62.
20. Bafandeh Y, Daghestani D, Esmaili H. Demographic and anatomical survey of colorectal polyps in an Iranian population. Asian Pac J Cancer Prev 2005; 6(4): 537-40.
21. Hoffmeister M, Schmitz S, Karmrodt E, Stegmaier C, Haug U, Arndt V et al. Male sex and smoking have a larger impact on the prevalence of colorectal neoplasia than family history of colorectal cancer. Clin Gastroenterol Hepatol 2010; 8(10): 870-6.
22. Bashar JQ, Susan C, Michael BW. The Effect of Polyp Location and Patient Gender on the Presence of Dysplasia in Colonic Polyps. Clin Transl Gastroenterol 2012; 3(7): e20.
23. National Cancer Institute. SEER Data 1973-2015 (including July-December 2005 Hurricane Katrina impacted Louisiana cases). [cited June 2017]. Available from: https://seer.cancer.gov/data/.
24. Rajendra S, Ho JJ, Arokiasamy J. Risk of colorectal adenomas in a multiethnic Asian patient population: race does not matter. J Gastroenterol Hepatol 2005; 20(1): 51-5.
25. Delavari A, Mardan F, Salimzadeh H, Bishehsari F, Khosravi P, Khanehzad M et al. Characteristics of colorectal polyps and cancer; a retrospective review of colonoscopy data in Iran. Middle East J Dig Dis 2014; 6(3): 144-50.
26. Almadi MA, Alharbi O, Azzam N, Wadera J, Sadaf N, Aljebreen AM. Prevalence and characteristics of colonic polyps and adenomas in 2654 colonoscopies in Saudi Arabia. Saudi J Gastroenterol 2014; 20(3): 154-61.
27. Eshghi MJ, Fatemi R, Hashemy A, Aldulaimi D, Khodadoostan M. A retrospective study of patients with colorectal polyps. Gastroenterol Hepatol Bed Bench 2011; 4(1): 17-22.
28. Muto T, Bussey HJ, Morson BC. The evolution of cancer of the colon and rectum. BCCancer 1975; 36(6): 2251-70.
29. O'Brien MJ, Winawer SJ, Zauber AG, Gottlieb LS, Sternberg SS, Diaz B et al. The National Polyp Study. Patient and polyp characteristics associated with high-grade dysplasia in colorectal adenomas. Gastroenterology 1990; 98(2): 371-9.
30. Einspahr JG, Alberts DS, Gapstur SM, Bostick RM, Emerson SS, Gerner EW. Surrogate end-point biomarkers as measures of colon cancer risk and their use in cancer chemoprevention trials. Cancer Epidemiol Biomarkers Prev 1997; 6(1): 37-48.