

Original Research Article

Study of mid and long term outcome of hip fracture in elderly operated within 48 hours versus conservative management

Delis S. Marshall^{1*}, Alan S. W. Ch'ng^{1,2}, Irene Looi^{1,2}

¹Clinical Research Centre, Hospital Seberang Jaya, Ministry of Health, Penang, Malaysia

²Department of Medicine, Hospital Seberang Jaya, Ministry of Health, Penang, Malaysia

Received: 26 July 2021

Accepted: 02 September 2021

*Correspondence:

Dr. Delis S. Marshall,

E-mail: suzancrc@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial

ABSTRACT

Background: Hip fractures are commonly associated with high morbidities and mortalities. This study aimed to determine post-hip fracture outcomes and survival among patients who underwent operation within 48 hours of fracture diagnosis and among those being treated conservatively.

Methods: This retrospective cohort study was conducted at Hospital Seberang Jaya among patients diagnosed with hip fracture from January to December 2016; confirmed by clinical and radiological method. Descriptive analysis was conducted using Statistical package for social sciences (SPSS) version 23.

Results: The mean (SD) age of the 61 operated patients was 74 (7.7) years and for the 19 conservatively managed patients 79 (8.0) years. At 12 months, 30 (37.5%) of operated ones, required assisted mobility compared to 8 (10%) of conservatively managed patients. Other outcomes comparable between operated and conservative patients at 12 months post-intervention include: ability to feed on own 46 (57.5%) versus 7 (8.8%), able to dress on own, 45 (56.3%) versus 6 (7.5%); able to bathe on own; 43 (53.8%) versus 2 (2.5%), and independently attending to own toilet needs 44 (55.0%) versus 1 (1.3%). Our study revealed, overall survival were comparatively better among those operated to conservative at 12 months; 52 (85%) versus 9 (47.4%). The mortality at 12 months in the conservative group is much higher than operative group.

Conclusions: Ambulatory mobility and survival are significantly better at 12 months post-fracture among the operated patients. Hip fracture must be treated as an emergency and its surgical management given priority.

Keywords: Elderly fracture, Fracture neck of femur, Hip arthroplasty, Sub trochanteric fracture, Hip fracture

INTRODUCTION

Elderly involves multidimensional process that intertwines biological, sociological, economic and chronological aspect.¹ Ministry of Health Malaysia (MOH) defined elderly as greater than or equal to 60 years age and taken in our study.² The United Nation quoted 60 years or 65 years and more as elderly.³ According to the report released by the department of Statistic Malaysia, between the year 2000 and 2010, a trend towards elderly population aged 65 years and beyond is rising from 3.9 per cent to 5.1 per cent respectively.⁴ This was also quoted in another study on demographic trend in the elderly in Malaysia.¹ In

1997 in Malaysia hip fracture incidence in individuals >50 years was 90 per 100,000; it was seen more in the elderly age group and female.^{5,6} In a study involving six Spanish regions, hip fracture gave an impact to the society and economic growth of that country.⁷ In MOH report, the mean life expectancy was 72.3 in males and 77.2 in females thus contribute to elderly population with osteoporosis and related fracture more common.² High mortalities and morbidities are associated with hip fracture.⁸⁻¹¹ Only 25 per cent are able to resume activities in which, most are disabled.^{8,10} The goals of treatment are early mobilisation, return to activities of daily living (ADL) and improved quality of life (QoL). In a review

conservative management of hip fractures carried several risks hence best treated by early operation.¹⁰ The comparison between operated versus conservatively managed hip fracture in the elderly is explored to study outcomes and survival. The specific objective was to determine the post-fracture dependency level up to 3 months and at 12 months between operated and conservative management, to compare outcome measures of operative intervention post admission; early (<48 hours) versus late (>48 hours). The expected outcome is audit on operation time from admission, percentage of patients operated, and investigated, and dependency level at 3 months and 12 months post fracture.

METHODS

Study design and setting

This retrospective cohort study was conducted from June 2018 till January 2019 at the Hospital Seberang Jaya (HSJ), Penang, Malaysia, among patients diagnosed with hip fracture from January to December 2016. HSJ is the lead hospital in an urban setting and comes under the cluster group of four hospitals in the Seberang Perai district. This is a 393 bed hospital and considered the second largest hospital in Penang.¹² In a cluster group of hospital, a patient uses the same registration number and can be transferred to any of the four hospitals for the duration of illness.

Variables

In this study, the dependent variables are the functional outcome of patients with elderly hip fracture who were operated versus conservatively managed. The independent variables are age, gender, date of onset, physical activity, body weight, calcium supplement intake, cups of coffee per day, nature of fall, interval between fall and admission and operation, smoking, pre-morbid ADL, diagnostic imaging, co-morbid, medication, outcome, operated versus conservative, ADL on mobility, feeding, dressing, bath, and toilet, on own or supervised or assisted at 3 months and 12 months.

Participants and sample size

Permission from Health Information Centre Services of MOH to release essential information is obtained through the records unit of HSJ who receives in encrypted manner to ensure Privacy and Confidentiality. The information consists of ICD-10 code of discharge (Encounter) of hip fracture from January 2016 till December 2016, enlisted are; names, Malaysian identity card number, hospital registration number and contact number which is used to trace the records. The total patients are 104 but only 80 were contactable. The inclusion criteria are; all males and females aged 60 and above, confirmed hip fracture clinically and radiologically from January 2016 till December 2016, and admitted to HSJ and those who took 'at own risk discharge' (AOR) from HSJ. Excluded are

those who are not contactable and refused consent. The interviewees are the guardian or next of kin if the patient unable to speak. Out of 80 who were contactable, 5 died before 3 months post fracture, another 14 died after 3 months post fracture but before 12 months post fracture.

How data is collected

The patients' records are traced and all information entered into the data collection sheet (Appendix Document 1 and Figure 1) which has serial subject identity number and linked on a password protected database, accessible to the author only. Any further information not available is clarified during the interview.

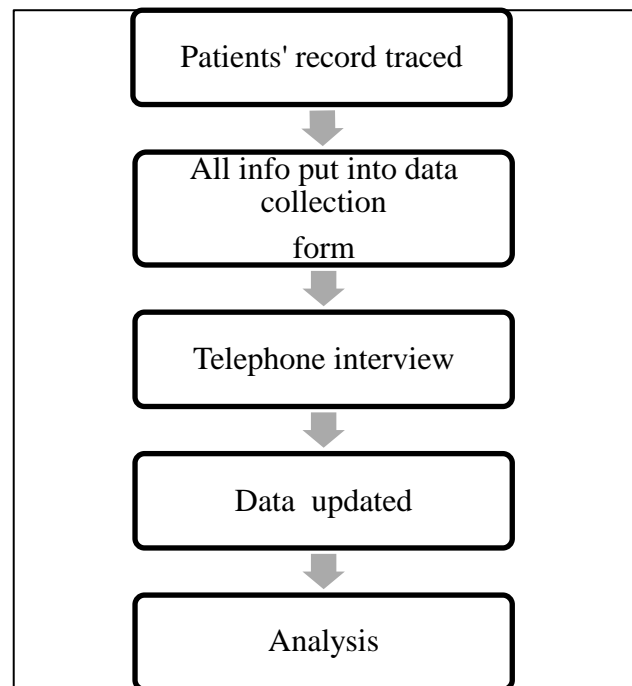


Figure 1: Flow chart of data collection.

The telephone interview script is modified from the template of the participant information sheet from CRC website.¹³ The Interview is conducted during working hours on weekdays from August 2018 till January 2019. Only one phone call is made and verbal consent obtained. The dependency level was asked at 3 months and 12 months post fracture on ability to mobilise, feeding, dressing, and bathing and toilet needs, each done independently or supervised or assisted.

Statistical analysis

Descriptive analysis was conducted using Statistical package for social sciences (SPSS) version 23. For continuous variables, mean and standard deviation were reported (variables were normally distributed). For categorical variables, the frequencies and percentages were reported.

RESULTS

Socio-demographic and clinical characteristic of the patients (n=80)

The mean (SD) age was 74 (7.7) in the operated group and ranged between 60 and 84 years old. In the conservative group the mean (SD) age was 79 (8.0) and ranged from 65 to 91 years. Our sample constituted of 30 (37.5%) males and 50 (62.6%) females. Females predominate in both operated and conservative groups; 37 (46.3%) versus 13 (16.3%) compared to males respectively; 25 (31%) versus 5 (6.3%). In ethnicity, Chinese predominate in both operative and conservative groups; 29 (38.8%) versus 11 (13.8%). On social habits, (36) 48.6% do not take coffee

at all and (30) 40.5% respondents take 1 cup of coffee per day. At time of fracture 12 (15%) are active smokers. Only 16 (23.5%) take daily dairy products, while 52 (76.5%) do not take at all. On patients taking calcium tablets, only 17 (21.5%) daily, while 54 (68.4%) none. During follow up, 34 (42.5%) were prescribed calcium and vitamin D. 61 (76.3%) were operated and 19 (23.8%) were conservatively managed. Majority, 65 (81.3%) sustained hip fracture from low impact fall. 15 (18.8%) had prior fracture. Premorbid, 61 (76.3%) are of independent mobility and 17 (21.3%) use walking stick and 77 (96.3%) were physically active. The interval of seeking treatment post fall is 3 days and ranged from 1 to 23 days. The audit time from admission to operation is 6 days and duration is 1 to 17 days.

Table 1: Socio-Demographic and clinical characteristic of the patients (n=80).

Variables	N	%
Demographic characteristics		
Age	Mean SD Min; Max	
Operated	Mean age 74; SD7.7; Min 60 years; Max 84 years	
Conservative	Mean age 79; SD 8; Min 65 years; Max 91 years	
Gender		
Male	30	37.5
Female	50	62.5
Race		
Malay	24	30
Chinese	41	51.3
Indian	15	18.8
Social habits		
Coffee intake per day		
No coffee	36	48.6
1 cup	30	40.5
2 cups	5	6.8
> 2 cups	3	5.2
Active smokers		
Yes	12	15
No	68	85
Daily dairy products intake		
Yes	16	23.5
No	52	76.5
Calcium tablets		
Daily	17	21.5
Irregularly	8	10.1
Not at all	54	68.4
Oral Calcium and Vitamin D during follow up		
Yes	34	42.5%
Clinical characteristics		
	n=80	%
Intervention		
Operated	61	76.3
Conservative	19	23.8
Intervention and gender		
Male		
Operated	24	30
Conservative	6	7.5

Continued.

Variables	N	%
Female		
Operated	37	46.3
Conservative	13	16.3
Intervention and race		
Malay		
Operated	20	25
Conservative	5	6.3
Chinese		
Operated	29	38.8
Conservative	11	13.8
Indian		
Operated	12	15
Conservative	3	3.8
Fall impact		
High impact	13	16.3
Low impact	60	75
No info	7	8.8
Prior fall with fracture before current fall		
Yes	15	18.8
No	65	81.3
Ambulatory dependency (use of walking aid) prior to fracture		
Independent	61	76.3
Walking stick	17	21.3
Wheelchair	2	2.5
Physical activity (daily walking prior to fall)		
Yes	77	96.3
No	3	3.8
Audit time from admission to operation	Mean 6.2 Min 1.0 Max 17 Mean interval in days is 6.2 days (SD3.4 and duration range from 1/7 to 17/7)	NA
Interval time from fracture to admission	Mean interval was 3 days (SD 4.32) and range from 1 day to 23 days.	NA

Table 2: Post Fracture dependency level at 3 months and at 12 months (n=80).

Dependency Level post hip fracture	Physical activity (ADL)	Level of activity	Operated (n=59) N (%)	Conservative (n=16) N (%)
At 3/12	Mobility	Own Self	6 (7.5)	0
		Supervised	0	0
		Assisted	53 (66.3)	16 (20)
	Feeding	Own Self	46 (57.5)	9 (11.3)
		Supervised	0	1 (1.3)
		Assisted	13 (16.3)	6 (7.5)
	Dressing	Own Self	39 (48.8)	5 (6.3)
		Supervised	10 (12.5)	3 (3.8)
		Assisted	10 (12.5)	8 (10)
	Bathe	Own Self	23 (28.8)	1 (1.3)
		Supervised	13 (16.3)	4 (5.0)
		Assisted	23 (28.8)	11 (13.8)
	Toilet	Own Self	22 (27.5)	1 (1.3)
		Supervised	11 (13.8)	3 (3.8)
Assisted		26 (32.5)	12 (15)	
	Physical activity (ADL)	Level of activity	Operated (n=52)	Conservative (n=9)
At 12/12	Mobility	Own Self	21 (26.3)	1 (1.3)
		Supervised	1 (1.3)	0 (0)
		Assisted	30 (37.5)	8 (10.0)

Continued.

Dependency Level post hip fracture	Physical activity (ADL)	Level of activity	Operated (n=59) N (%)	Conservative (n=16) N (%)
Feeding		Own Self	46 (57.5)	7 (8.8)
		Supervised	1 (1.3)	0 (0)
		Assisted	5 (6.3)	2 (2.5)
Dressing		Own Self	45 (56.3)	6 (7.5)
		Supervised	2 (2.5)	0 (0)
		Assisted	5 (6.3)	3 (3.8)
Bathe		Own Self	43 (53.8)	2 (2.5)
		Supervised	0	0 (0)
		Assisted	9 (11.3)	7 (8.8)
Toilet		Own Self	44 (55.0)	1 (1.3)
		Supervised	0	0 (0)
		Assisted	8 (10.0)	8 (10.0)

Table 3: Comparison of comorbid, race, age and gender in operated group and conservative group.

Co-morbidities	Operated group (n=61)								Conservative (n=19)			
	Male				Female				Male (n=6)		Female (n= 13)	
	Operated <48 hours post admission (n=4)	Operated >48 hours post admission (n=20)	Operated < 48 hours post admission (n=7)	Operated > 48 hours post admission (n=30)	≤75 years	>75 years	≤75 years	>75 years				
Nil	1	1	1	2	0	0	3	6	0	1	2	1
1	1	0	2	2	2	0	7	1	2	1	1	3
2 or more	1	0	8	5	1	2	7	8	2	0	0	6
Race												
Malay	0	1	6	4	2	1	3	3	0	2	2	1
Chinese	2	0	5	3	1	3	8	9	2	1	1	7
Indians	1	0	2	0	0	0	6	1	1	0	0	2

Table 4: Outcome measure between surgical and conservative group.

Post fracture duration	Number of deaths		
	Operative intervention (n=61)		Conservative (n=19)
	Less than 48hours post admission	More than 48 hours post admission	
0-3 months	0	2	3
4-12 Months	2	5	7

Post fracture dependency level at 3 months and at 12 months (n=80)

Total number is 80; 61 in operated group and 19 in conservative group. 5 patients died before 3 months. (3 conservatively treated and 2 operated) and another 14 died after 3 months but before 12 months. (7 operated and 7 treated conservatively). In independent mobility, at 3 months, 6 (7.5%) from operated group, versus none in the conservative group; at 12 months, 21 (26.3%) versus only 1 (1.3%) respectively. In ability to feed on own, at 3

months, 46 (57.5%) in the operated group versus 9 (11.3%) in conservative group; 12 months 46 (57%) versus 7 (8.8%) respectively. In ability to dress on own at 3 months, 39 (48.8%) in the operated group versus 5 (6.3%) in conservative group; at 12 months 45 (56.3%) versus 6 (7.5%) respectively. In ability to bathe on own, at 3 months, 23 (28.8%) in the operated group versus only 1 (1.3%) in conservative group; at 12 months, 43 (53.8%) versus 2 (2.5%) respectively. In independent toilet usage at 3 months it was 22 (27.5%) in operated group versus 1 (1.25%) in conservative group; at 12 months, 44 (55%) versus 1 (1.3%) respectively.

Comparison of comorbid, race, age and gender in operated group and conservative group

In the operative group, 14 had no co-morbidities, 15 had one co-morbid and 32 had two or more co-morbidities and in the conservative group 4 had no co-morbidities, 7 had one co-morbid and 8 had two or more co-morbidities. Two or more comorbid are seen in both males and females in those operated more than 48 hours and in conservative groups. In the conservative group, those with two or more comorbidities are females aged more than 75 years old while in the males, they are less or equal to 75 years old. More Chinese females aged more than 75 years old were operated more than 48 hours and also belongs to the conservative group. In Indians, more females compared to males were aged 75 years or less were operated more than 48 hours post admission. More Indian females who were conservatively managed aged more than 75 years.

Outcome measure between surgical and conservative group

Out of 61 operated, 2 had died within 3 months post fracture and both were operated more than 48 hours after admission and another 7 died between 4 months to 12 months post fracture, out of which 2 were operated less than 48 hours and 5 after 48 hours post admission. Out of 19 conservatively managed patients, 3 died within 3 months post fracture and another 7 died between 4 months to 12 months.

DISCUSSION

In the males, the average age was 74.1 and females 76.4. This is comparable to a prospective observational study in which no difference in mean age was noted.⁷ In ethnicity, Chinese preponderance seen in both groups as mentioned in other reviews.^{5,6} Our study also showed elderly female preponderance as in other review.^{1,5}

Our study also showed improvement in ambulatory status and ADL among the operated group versus conservative group at 12 months post-fracture (Table 1, 2, 4); It alluded female preponderance as in another review.⁵ In the comparison post fracture 12 months, 75.1 % achieved ambulatory status with or without assistance as compared to 11.3% in the conservative group. In a previous study authors quoted 55% achieved independent ambulatory status with or without walking aid which is much lower than our study.⁹ However, in our study taking into account of independent mobility alone, it is 21 (26.3%), 12 months post fracture as compared to pre-morbid 61 (76.3%) and 1 (1.3%) in the conservative group. Majority of our elderly were physically active in the pre-morbid and mostly sustained hip fracture from low impact fall 60 (75%) which is higher compared to another study, in which 59.7% had been reported as low impact fractures.⁷ Our study shows that operative intervention has helped improve QoL in the area of ADL. Early mobilization and discharge was reported following operative intervention compared to

conservative management of hip fracture though no time frame of operation intervention was mentioned.⁹ Our study revealed that 54 (76.1%) had sought treatment within 24 hours of fall (Table 1); 15 elderly (18.8%) had prior history of fracture, this is much lower compared to another study, where one-third of patients, 162 (33%) had previous fracture.⁷ In our study only one was put on bisphosphonate and only one had Bone mineral density (BMD) investigated. There are more survivors in the operative group irrespective of early or late operation compared to conservative group; survival was 52 (85.2%) versus 9 (47.4%); (Table 3). In a study, at 12 months, the mortality in operative versus conservative was 6.6 % versus 29.8% and at 24 months the mortality was higher 13.7 % versus 45.6 %.⁸ In comparison of age and gender versus early or late operation, in the operated group more males are aged 75 years and less are independent of operation hours. More elderly females are operated early. In the conservative group, more elderly females are conservatively managed compared to males. In our study, having 2 or more comorbidities in both genders is not a deterrent to operability and are operated late. In the conservative group, more comorbid are in the elderly females aged more than 75 years. Irrespective of the age more Malay males were operated. All three ethnicities showed almost 3:1 ratio of operation versus conservative management in our study. Our male had higher operable rate 24:6 compared to female. Our findings are different from a review where mortality in hip fracture among the elderly decline but comorbid increased.¹⁴ Our study showed hypertension and diabetes are the commonest co-morbid encountered in both groups. This is the same finding in a previous study.⁹ Our elderly mostly do not take coffee. There are studies which did not support associations between coffee and fracture risks.^{11,16,17} In a review it was suggested that attention must be paid on secondary osteoporosis and supplementation is necessary where there is inadequacy.¹⁸ In a study during follow up, 18 (3.7%) patients had one new fracture but in our study none had new fracture.⁷ The mean average body weight of our elderly is 59 kg; 45 % of the elderly are less than 55 kg. In the Osteoporosis self-assessment tools chart indicated, those less than 55 kg between ages 55 years and 74 years are under the medium risk for fracture and those 75 years and above are under high risk group.¹⁹ During follow up, serum calcium was checked in only 3 (3.8%), and Vitamin D assay only in 1 (1.25%). In our study, there is marked reduced independent ambulation comparing pre-morbid, 61 (76.3%) versus operated 12 months post fracture, 21 (26.3%). Our study also shows there is poor intake of dairy products and supplemental calcium, use of anti-osteoporosis agent and inadequate BMD screening. Majority too experienced hip fracture from low impact fall. All these will certainly have an impact on QoL. With the rising trend of aging population in our country, it be burdensome to our economic sector and our society as in other countries.^{14,20,21} Operative intervention among the elderly hip fracture can improve outcome of ADL and QoL. The conservative group has higher mortality compared to operated group (Table 4). However more

studies are needed to compare the two groups for longer term outcome in terms of ADL, dependency and survival. Our male had higher operable rate 24:6 compared to female. Ambulatory mobility and survival are significantly better at 12 months post-fracture among the operated patients compared to the conservatively managed elderly. Hypertension and diabetes are the common comorbidities observed in both groups. Having comorbidities is not an absolute deterrent to operability. Hip fracture must be treated as an emergency and its operative management must be given priority.

Strengths

Detailed comparisons on ADL and the mid-term and long-term outcomes and also comparing the ethnic, gender, comorbidities and age; between operated and conservative groups was comprehensive. The detailed demographic characteristics are explored too.

Study limitations

A longer follow up beyond 12 months post fracture will enlighten on the QoL. A study carried out in 11 countries on longer term follow up which included hip fracture, showed remarkable decline in QoL.²⁰ HSJ being a cluster hospital, the average length of stay in HSJ could not be analyzed. Delay in retrieving few medical records was encountered too.

CONCLUSION

Ambulatory mobility and survival are significantly better at 12 months post-fracture among the operated patients. Hip fracture must be treated as an emergency and its surgical management given priority.

Recommendations

More local studies exploring longer term outcome, QoL, health cost incurred, audit on operation time to admission and intervals of seeking treatment. To delve further on Cluster Hospital concept versus overcrowding in wards. Complications comparison in operated versus conservative groups. To incorporate domiciliary care among this vulnerable elderly is ideal. A multidisciplinary team approach in a respite care home for functional recovery as intermediary before return home can significantly reduce dependency and risk of abuse.

ACKNOWLEDGMENTS

We would like to thank the Director General of Health Malaysia for his permission to publish this article. We also thank the records' department of HSJ.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. H.A Karim. Global Theme issue: The elderly in Malaysia: Demographic trends *Med J Malaysia.* 1997;52(3):206-12.
2. Country Report Malaysia. Available at: www.mblw.jp/bunya/kokusaigyomu/asean/2013/dl/Malaysia. Accessed on 8 March 2021.
3. Planning and Organization of Geriatric Services (World Health Organization; Technical Report Series No. 548). Available at: https://apps.who.int/iris/bitstream/handle/10665/38754/WHO_TRS_548_eng.pdf?sequence=1. Assessed 24 February 2021.
4. Department of Statistics Malaysia; Population Distribution and Basic Demographic Characteristic Report 2010; Available at: https://www.dosm.gov.my/v1/index.php?r=column/cthem&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09&bul_id=MDMxdHZjWtk1SjFzTzNkRXYzcVZjdz09#. Accessed on 15 January 2021.
5. My Health MOH. Malaysia. Osteoporosis. Available at: <http://www.myhealth.gov.my/en/osteoporosis-2/>. Accessed on 18 January 2021.
6. CPG osteoporosis 2012 (2nd edition 2015). Available at: [file:///C:/Users/crchsj03/Downloads/CPG%20Management%20of%20Osteoporosis%20Second%20Edition%20\(2015\).pdf](file:///C:/Users/crchsj03/Downloads/CPG%20Management%20of%20Osteoporosis%20Second%20Edition%20(2015).pdf). Accessed on 25 January 2021.
7. Caeiro JR, Bartra A, Ramos MM, Etxebarria I, Monteiro J, Carpintero P et al. Burden of First Osteoporotic Hip Fracture in Spain: A Prospective, 12-month, Observational Study. *Calcif Tissue Int.* 2017;100(1):29-39.
8. Eileen Tay; *Singapore Med J.* 2016 Apr; 57(4): 178-81. doi :10.11622/smedj.2016071.
9. Tan STS, Tan WPM, Jaipaul J, Chan SP, Sathappan SS. Clinical outcomes and hospital length of stay in 2,756 elderly patients with hip fractures: a comparison of surgical and non surgical management. *Singapore Med J.* 2017;58(5):253-7.
10. Lee JK, Khir ASM. The incidence of hip fracture in Malaysians above 50 years of age: variation in different ethnic groups. *APLAR J Rheumatol.* 2007;10:300-5.
11. NIH Consensus Development Panel on Osteoporosis Prevention, Diagnosis, and Therapy. *JAMA.* 2001;285(6):785-95.
12. Hospital Seberang Jaya website; Available at: jknpenang.moh.gov.my/hsj/index.php/cluster. Accessed on 25 January 2021.
13. CRC website. Available at: www.crc.gov.my. Accessed on 25 January 2021.
14. Brauer CA, Perrailon MA, Cutler DM, Rosen ABD. Incidence and Mortality of Hip Fractures in the United States. *JAMA.* 2009;302(14):1573-9.
15. Cummings SR, Nevitt MC, Brower WS. Risk factors for hip fracture in white women. Study of Osteoporotic Fractures Research Group. *N Engl J Med.* 1995;32:767-73.

16. Lloyd T, Johnson-Rollings N, Egli DF, Kieselhorst K, Mauger EA, Cusatis D. Bone status among postmenopausal women with habitual caffeine intakes: a longitudinal investigation. *J Am Coll Nutr*. 2000;19:256-61.
17. Hannan MT, Felson DT, Dawson-Hughes B. Risk factors for longitudinal bone loss in elderly men and women: The Framingham Osteoporosis Study. *J Bone Miner Res*. 2000;15:710-20.
18. Klibanski A, Adams-Campbell L, Bassford T. Consensus Development Panel on Osteoporosis Prevention, Diagnosis, and Therapy. *JAMA*. 2001;285(6):785-95.
19. Yeap SS, Hew FL, Damodaran P, Chee W, Lee JK, Goh EML et al. A summary of the Malaysian Clinical Guidance on the management of postmenopausal and male osteoporosis. *Osteoporosis and sarcopenia*. 2016;52(3):201-3.
20. Azagra R, Lopez-Exposito F, Martin-Sanchez JC. Incidence of hip fracture in Spain (1997-2010). *Med Clin*. 2015;145:465-70.
21. Svedbom A, Borgstöm F, Hernlund E, Ström O, Alekna V, Bianchi ML et al. Quality of life for up to 18 months after low-energy hip, vertebral, and distal forearm fractures—results from the ICUROS. *Osteoporosis Int*. 2017;12(4):42-9.

Cite this article as: Marshall DS, Ch'ng ASW, Looi I. Study of mid and long term outcome of hip fracture in elderly operated within 48 hours versus conservative management. *I Int J Res Orthop* 2021;7:1070-9.

APPENDIX

Instruments (Tools)

Subject ID: _____

Version 2

Data collection form: Study on mid and long term outcome of hip fracture in elderly patients operated within 48hours versus conservative management.

1. Demographics	
1.1 Case No:	
1.2 Age:	1.3 Race:
1.4 Gender:	<input type="radio"/> Male <input type="radio"/> Female
1.5 Menopause age	<input type="radio"/>
2. Clinical presentation (at onset)	
2.1 Date of onset:	
2.2 Nature of fall (Low /high impact fall)	
2.3 Time of arrival to AE	
2.4 DOA	
2.5 DOD	
2.6 Clinical notes	<ul style="list-style-type: none"> * Physical activity: yes / No: specify: * Body weight (Kg): * Oral supplement of calcium: High calcium milk / dairy products/ oral * Cups of coffee per day: * Past nature of fall (s) if any: * Steroids (Long term/ short term): * Cancer Therapy: * Premorbid ADL (B4 fall): * Smoking: * New Fractures * Others: Please specify _____
2.7 Eleven items of the modified Frailty Index	<ul style="list-style-type: none"> * H/O DM * H/O CCF * H/O HT requiring medication * H/O either TIA or CVA * Functional status 2 (not independent) * H/O MI * H/O either peripheral vascular disease/rest pain * H/O CVA with neurological deficit * H/O either COPD or pneumonia * H/O either prior PCI, PCS, or angina * H/O impaired sensorium * New Fractures
3. Co- morbid	* Specify
4. Medications	
5. Diagnostic investigation	
5.1. Vitamin D assay:	
5.2. * BMD:	
5.3 Serum Calcium (corrected total)	
6. Treatment	
6.1 Oral Calcium:	
6.2 Anti Osteoporotic agents & Duration: Biphosphonates / Denosumab / Teriparatide/	
6.3 Operated / Conservative	
6.4 Vitamin D supplement	
6.5 Others	

7. Outcome			
7.1 Alive		7.2 Death	
<input type="radio"/> 3/12 since fall <input type="radio"/> 12/12 since fall		<input type="radio"/> Date: <input type="radio"/> Cause of death:	
7.3 ADL			
At 3/12	Own self	Supervised	Assisted
a) Mobility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Feeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Dressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Bath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.4 ADL			
At 12/12	Own self	Supervised	Assisted
a) Mobility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Feeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Dressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Bath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5 Operated	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.6 Time and date of operation:			