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MODEL OF CARE
MANAGEMENT OF HIP FRACTURE
HOSPITAL KUALA LUMPUR

GFLS
Hospital Kuala Lumpur

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Model of care:

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Hospital Kuala Lumpur

ACKNOWLEDGEMENT

This model of care is the result of the collaborative efforts of many dedicated professionals. We extend our deepest gratitude to the experts, practitioners and patients who shared their experiences and insights, making this comprehensive guide possible.

Let us move forward with a shared commitment to excellence in fracture care and prevention.

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PREFACE

The incidence of fragility fractures, particularly among the aging population, has reached alarming levels, imposing significant personal, societal, and economic burdens. Addressing this challenge requires a strategic, multi-disciplinary approach, one that not only treats fractures but also actively works to prevent their recurrence. The model of care hopes to provide a guide aiming to bridge the gap between fracture occurrence and comprehensive post-fracture care.

This model of care serves as a guide for healthcare providers involved in the establishment and operation of hip fracture management. This resource aims to provide insights into the best practices and clinical pathways that underpin successful models worldwide.

In the chapters that follow, readers will find detailed discussions on core components required for effective service delivery. We delve into the roles and responsibilities of the multidisciplinary team members, as fostering collaboration across disciplines and leveraging evidence-based practices, can transform fracture care and significantly reduce the burden of osteoporosis-related fractures.

We hope this guide serves as an indispensable resource, inspiring healthcare professionals to advocate for and implement an effective hip fracture management. Together, we can advance the standard of care for patients at risk of fragility fractures and build a healthier, more resilient population.

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ACUTE HIP FRACTURE PATHWAY

HOSPITAL KUALA LUMPUR

INTRODUCTION

MULTIDISCIPLINARY APPROACH IN ACUTE HIP FRACTURE

PREOPERATIVE

Hip fracture is the commonest reason for admission for the older person to an orthopaedic trauma ward and it is usually a 'fragility' fracture caused by a fall.[1,2,3] Globally, the estimated hip fractures range between 7.3 and 21.3 million by 2050. [17] Malaysia will be an ageing nation by 2030. A higher activity level in the older person predisposes them to a subsequent greater risk of falling causing hip fractures, which leads to an increasing challenge to the health care system.[4]

Mortality associated with hip fracture is high. About 10% of people with a hip fracture die within 1 month and about one third within 12 months. The occurrence of a fall and fracture often signifies an underlying ill health status as many older persons with fractures have complex medical problems. Quality of life is affected by hip fractures. Half will return to their premorbid status, whilst the rest will require some form of help such as a walking aid or assistance from others. Therefore, hip fractures should not exclusively be a surgical concern but all underlying risk factors and comorbidities should be addressed concurrently. [1,5]
Studies have found that older persons with enhanced multidisciplinary care and rehabilitation, had lower complications, length of stay and institutional placements.[6]

The management of hip fracture requires the multidisciplinary coordination from the medical, orthopaedic, anaesthetic and rehabilitation teams. In addition, the management should encompass a comprehensive approach covering the entire course of the condition, from presentation to the subsequent follow-ups, including the transition from hospital to care in the community.[1] Studies have shown that the implementation of a clinical pathway for the treatment of patients with a hip fracture as useful, efficient and safe. It results in a significant reduction of the median hospital length of stay. [4]

Key elements of good care include: [1]

1. **Rapid assessment at the Emergency Department**
2. **Prompt admission to orthopaedic care**
3. **Early comprehensive assessment -**
   by the geriatric, orthopaedic and anaesthetic team
4. **Preoperative management:**
   Prevention of venous thromboembolism, delirium, chest infections, pressure sores, etc.
5. **Adequate analgesia**
6. **Minimal delay and well-performed surgery**
7. **Early multidisciplinary rehabilitation**
8. **Supported discharge and outpatient rehabilitation**
9. **Secondary prevention: combining falls prevention and bone protection**
10. **Falls assessment**

1

CARE AT PRESENTATION

EMERGENCY DEPARTMENT

A patient presenting to hospital with a suspected hip fracture should receive care guided by timely assessment and management of medical conditions, including diagnostic imaging, pain and cognitive assessments. [2, 3]

The Emergency department should obtain baseline information about the event to exclude other illness or injuries that may require immediate attention. Screening and stabilisation of any life threatening conditions should also be prioritized before reviewing the patient's suspected hip fracture.[3,5] Following that, a rapid assessment and diagnosis should be performed, together with the preparation for surgery in order to reduce the delay in time to surgery.[2]

Simple investigations should be performed such as:

- Blood investigations (Full Blood Count, Electrolytes, Blood sugar, Group and cross match)
- Electrocardiography (ECG)
- Chest X-ray
- X-ray of the hip

Computed tomography scan will help in diagnosing occult hip fractures in selected cases.[18]

Note: If acute confusion is present, a CT brain may be warranted.

The patient should be transferred to the ward promptly once bed is available.

2

CARE IN WARD

AVOID DELAY IN SURGICAL PROCEDURE

Further assessments should be performed once the patient has arrived in the ward. Perform surgery within 48 hours of admission, if feasible. [1]

Baseline information and history, including

- pre-fracture functional status,
- cognitive status and
- delirium screen should be obtained. [2]

Further blood tests are carried out (if required).

Medication adjustment is done or discontinued as needed.

Identify and treat correctable comorbidities immediately so that surgery is not delayed by: [1]

- anaemia
- anticoagulation
- volume depletion
- electrolyte imbalance

Management of acute illness should be ongoing eg. correctable cardiac arrhythmia or ischaemia, acute infections, management and optimization of poorly controlled chronic conditions such as diabetes, heart failure, hypertension and chronic lung conditions.[1]

Acceptable and unacceptable reasons for delaying surgery in hip fracture patients according to published guidelines [19]

Acceptable	Not Acceptable
Haemoglobin concentration < 8gm/dL	Lack of facilities or theatre space
Plasma sodium concentration < 120 or > 150 mmol/L	Awaiting echocardiography
Pottasium concentration < 2.8 or > 6.0 mmol/L	Unavailable surgical expertise
Uncontrolled diabetes	Minor electrolyte abnormalities
Uncontrolled or acute onset left ventricular failure	
Correctable cardiac arrythmia with a ventricular rate > 120bpm	
Chest infection with sepsis	
Reversible coagulopathy	

Note: Sodium level preferably above 125mmol/L

Early surgery (<48h) should be encouraged as studies have shown a statistically significant:[1,2]

- reduction in morbidity and mortality
- increased return to independent living
- reduction in major and minor complications with early surgery

Increased time to surgery causes prolongation of pain, extended inpatient stay and is associated with an increase in morbidity and mortality.[2] Patients operated within 48 hours show a 20% lower risk of dying within the next year, and especially patients with comorbidities benefit significantly from surgery within 24 hours. [28]

3

PREOPERATIVE CARE

Preoperative care should be provided comprehensively with a multidisciplinary approach.

WARD CARE:

- ✓ Nursing observations that includes: general and neurovascular assessment
- ✓ Analgesia
- ✓ Fluid balance
- ✓ Nutritional screening with high protein and energy diet
- ✓ Urinary catheter (if required)
- ✓ Dynamic pressure relieving mattress

ORTHOGERIATRICS

- ✓ Medical assessment and management of comorbidities
- ✓ Medication review
- ✓ Cognitive screening
- ✓ Functional Assessment
- ✓ Individualised and patient centered care plans including discharge planning

ANAESTHESIOLOGY

- ✓ Early review
- ✓ Preparation for reduction in risk of intra and postoperative complications

ORTHOPAEDICS

- ✓ Surgical suitability assessment
- ✓ Preparation for operation

4 MULTIDIMENSIONAL INTERVENTION

MULTIMODAL ANALGESIA

Assessment for pain should be performed and treated promptly upon arriving at the emergency department. [2,3] Assess the patient's pain: [3]

- immediately upon presentation at hospital
- within 30 minutes of administering initial analgesia
- hourly until settled on the ward
- regularly as part of routine nursing observations throughout admission, using a pain scale

It is important to consider the use of multimodal analgesia to reduce dose-dependent opioid-related side effects.[2,4] Nonnarcotic systemic analgesics, such as acetaminophen and non steroidal anti-inflammatory drugs (if not contraindicated), and peripheral nerve blocks, such as a fascia iliaca block or femoral nerve block, can improve pain control, reduce postoperative delirium, and reduce overall opioid requirements. [2]

Note: Please refer to Appendix for guidance on blocks

Offer IMMEDIATE analgesia to ALL patients presenting at hospital with suspected hip fracture, including people with cognitive impairment. Ensure analgesia is sufficient to allow movements necessary for investigations (as indicated by the ability to tolerate passive external rotation of the leg), and for nursing care and rehabilitation.

Offer:

- Paracetamol every 6 hours pre/post operatively.
- COX-2 inhibitors can be a recommendation for short term usage (unless contraindicated).
- Offer additional opioids if paracetamol alone does not provide sufficient pre/post operative pain relief.

Note: Non steroidal anti-inflammatory drugs (NSAIDs) are not recommended for the older persons [4]

DELIRIUM CARE

Patients who have a hip fracture are at risk for developing delirium. Hip fracture patients with delirium are more likely to have a longer hospital stay, development of pressure injuries and higher rate of mortality.[5] If delirium develops, it is important to identify and manage the underlying causes and attempts to treat the delirium should be instituted.[6]

Patients with hip fracture are screened for delirium using a validated tool as part of their initial assessment and then at least once every 12 hours while in hospital, after transitions between settings and after any change in medical status. Patients should receive interventions to prevent delirium and to promote recovery if delirium is present. [2]

Interventions to prevent delirium and to promote recovery from delirium include: [2]

- orientating the patient to time, place and person (involving family, carers and friends when possible)
- creating an environment that provides context (e.g., with a window or clock) and contains familiar items (eg. pictures or personal belongings).
- ensuring patients are using their glasses or hearing aids as appropriate
- speaking to patients in a calm and reassuring voice
- considering alternative or the practice of more judicious use of drugs that may either cause or exacerbate delirium.

Healthcare professionals should deliver care that minimises the patient's risk of delirium and maximises their independence, by:[1]

- actively screening for confusion and cognitive impairment
- reassessing patients regularly to identify delirium that may arise during their admission

If the patient is persistently confused: [1]

- Ensure that the trauma is not related to a neurological event (eg. subdural haemorrhage, infarct)
- Look out for acute causative factors of delirium (eg. infection, pain, constipation)
- Offer individualised care in line with 'Delirium'

Note : Further reference: Position Statement on Delirium

NUTRITIONAL ASSESSMENT

The older person with hip fracture are frequently malnourished with reduced muscle mass and strength, which diminishes the adipose tissue that protect the hip and increase bone mineral density losses leading to falls and hip fracture.[6]

Prolonged repeated fasting prior to operation is also detrimental to health and rehabilitation of the patients.[7] In addition, malnutrition is likely to increase complications post hip fracture due to increased resting energy expenditure and requirements for protein and micronutrients, related to: [6]

- bone repair
- wound healing following surgery
- catabolic response to the fracture, which may last up to three months after orthopaedic surgery
- resistance exercise during rehabilitation

Post discharge, patients with hip fractures may have persistent poor dietary intake due to a variety of factors including: pain, medication side effects and poor physical function, which may inhibit the older person from preparing meals or even self feeding. Malnutrition is a significant risk factor in poor functional recovery following hip fracture and this indirectly leads to increased mortality. [7]

Simple interventions such as a nutritional assessment and tailored meal options should be performed routinely.[5] Nutritional screening with a validated tool (e.g. the Malnutrition Universal Screening Tool; MUST) is advisable on admission to hospital and appropriate care plans should be constructed to improve nutritional intake to meet requirements for recovery. [6]

The European Society for Clinical Nutrition and Metabolism (ESPEN) recommends protein intakes of ≥1.5 g/kg/day for patients with severe injury.[6] Optimization of dietary intake such as: food fortification, energy-dense snacks, feeding aids and assistance at meal times should be considered. [6]

5

ORTHOPAEDIC CARE

Comprehensive orthopaedic care is required perioperative, postoperative and after discharge.

PERIOPERATIVE CARE

Routine physical examination (foot drop, pulses).

Ensure routine x-rays are taken.

- AP view of pelvis including proximal half of the femur with contralateral leg in 15 degrees internal rotation.
- Lateral view of hip joint with proximal half of femur.
- Offer magnetic resonance imaging (MRI) if hip fracture is suspected despite negative anteroposterior pelvis and lateral hip X-rays. If MRI is not available within 24 hours or is contraindicated, consider computed tomography (CT). [8]

Preoperative traction:

The routine use of traction is not recommended prior to surgery for hip fracture.[9]

Moderate evidence does not support preoperative traction for patients with hip fracture.[10]

Surgical site:

Identify and scrutinize any evidence of skin rash, inflammation and active infection at planned skin incision site. Ensure no actively inflamed areas due to skin conditions such as psoriatic lesion and eczema at surgical site.[13]

Aim for surgery within 48 hours of admission.

Admission and bed allocation in clean zone of ward.

ANTIPLATLET AND DVT PROPHYLAXIS

Aspirin can be continued. There is limited evidence to support not delaying hip fracture surgery for patients on aspirin and/or clopidogrel.[10] However this needs to be discussed between managing teams as part of a multidisciplinary approach to hip fracture care.

Note: The continual use of antiplatelet use such as clopidogrel may limit the choice of post operative analgesia use such as regional or neuraxial anaesthesia.

Deep Vein Thrombosis (DVT) prophylaxis:

Heparin, Enoxaparin or Fondaparinux may be used for pharmacological DVT prophylaxis for hip fracture. Total duration of prophylaxis will be for 35 days.

Subcutaneous Enoxaparin (Clexane) 40 mg OD is used if there is no contraindication. If patient has renal impairment i.e. eGFR 15-30 ml/min/1.73m2, to use a lower dose SC Enoxaparin 20mg OD. Low Molecular Weight Heparin (LMWH) is administered 12 hours before surgery and/or restart 12/24 hours after surgery.

Contraindication to chemical prophylaxis:

- Stroke within the last 6 months
- Active peptic ulcer disease
- Proliferative diabetic retinopathy
- Platelet count less than 100,000
- INR of more than 2.0

Summary of antiplatelets and anticoagulants. [21]

Drug	Elimination half-life	Management	Acceptable to proceed with spinal
Aspirin	Irreversible effect on platelets	Proceed with surgery	Continue
Clopidogrel	Irreversible effect on platelets	Proceed with surgery, monitor for blood loss, consider platelet transfusion if concerns regarding bleeding	If anti-platelet monotherapy. General anesthesia if dual therapy
Ticagrelor	8–12 h	Proceed with surgery with general anaesthetic. Monitor for blood loss. Consider platelet transfusion if concerns regarding bleeding	5 days or post platelet transfusion at least 6 h post last dose
Warfarin	4–5 days	5 mg vitamin K i.v. and repeat INR after 4–6 h. This can be repeated or consider Beriplex for immediate reversal	If INR < 1.5
Apixaban	12 h	Surgery and anesthesia 24h after last dose if renal function is normal	2 half-lives/24 h after last dose if renal function is normal
Dabigatran	12–24 h	Surgery and anesthesia if thrombin time normal or idarucizumab for immediate reversal if thrombin time prolonged	If thrombin time normal or 30 min following idarucizumab infusion
Rivaroxaban	7–10 h	Surgery and anesthesia 24 h after last dose if renal function normal	2 half-lives/24 h after last dose if renal function normal
Low-molecular weight heparin subcutaneous prophylactic dose	3–7 h	Last dose 12 h pre-op	12 h
Low-molecular weight heparin subcutaneous treatment dose	3–7 h	Last dose 12–24 h pre-op. Monitor for blood loss	24 h
Unfractionated i.v. heparin	1–2 h	Stop i.v. heparin 2–4 h pre-op	4 h

6 ANAESTHESIA ASSESSMENT AND MANAGEMENT

Ensure all pre-op investigation (blood tests, CXR, ECG +/- Echocardiography) results are available when making a referral.

Referral:

- During office hours, call Anesthesiology Clinic at SCACC (ext 1133, 1134)
- Out of office hours / public holidays, refer to Anesthesiology Medical Officer (MO) or specialist on call (Trauma call / Peripheral call)

Pre-op Evaluation:

- Ensure medical conditions are optimized as best possible
- Review pre-op investigations (blood tests, CXR, ECG +/- Echocardiography)

In view to anesthetic management, take note of Antiplatelet/Anticoagulants that patient is currently on

- Aspirin can be continued.
- Limited evidence supports not delaying hip fracture for patients on aspirin and/or clopidogrel. [10]

Note: Decision to discontinue Clopidogrel should be at the discretion of the managing team after weighing risks and benefits

Note: *Recommendations for time to withhold prior to operation and neuraxial/regional anaesthesia for Fondaparinux is 24 to 36 hours for those with normal renal function.*

Patients to be discussed with Anaesthetist-in-charge of Anaesthesiology Clinic for the day (office hours) or Anaesthetist-on-call (out of office hours / public holidays)

Discuss with the Ortho-geriatric team if patient requires further investigations and/or optimization

- Proceed with surgery as planned if patient is deemed fit
- PACU/ICU bed booking as per patient requirement

Day of Surgery

Choice of Anaesthesia

- At the discretion of the Anaesthetist-in-charge following discussion of available choices for anaesthesia (General Anaesthesia +/- Regional block vs Central Neuraxial Blockade +/- Regional Blockade) with the patient / Family / Care-provider, taking into consideration patients' use of antiplatelet/anticoagulants
- Confirm availability of PACU/ICU bed if required (Arrangements should not cause delay in surgery)
- GXM (Group and Cross Match Blood) as per protocol

Post-op care

PACU/ICU if required

Pain control:

- At the discretion of Anaesthetist-in-charge, continue or add oral multimodal analgesia
- Acute Pain Service (APS) services available:
  - Epidural Analgesia
  - Regional block +/- catheter
  - Patient-controlled Analgesia (PCA)
  - SC Opioids (eg. Morphine/Oxynorm)

Restarting anticoagulants (DVT prophylaxis)

- Liaise with Anaesthetist-in-charge and APS team before restarting anticoagulants when patients have post-op epidural catheter or peripheral nerve/plexus block with catheters

7 PREPARATION FOR SURGERY

Treatment options, explained by primary surgeon – conservative, hemiarthroplasty or total hip replacement.

Offer total hip replacement to patients with a displaced intracapsular fracture who: [8]

i) were able to walk independently out of doors with no more than the use of a stick and

ii) are not cognitively impaired and

iii) are medically fit for anaesthesia and the procedure.

Use a proven femoral stem design rather than Austin Moore or Thompson stems for arthroplasties. [8]

Once patient has agreed for surgery, consent and the risk of operation will be explained to the patient (Appendix 1). Patient and family members will be taught regarding hip precaution post-surgery and a leaflet regarding hip precaution will be given (Appendix 2).

Start chest physio, incentive spirometry and 2 hourly position change.

Ripple mattress to be included as post op preparation in ward, allocated for patients.

Urinary catheter will be inserted in the operating theatre.

Body cleansing with chlorhexidine gluconate the night before and morning of the surgery.[13]

8 DAY OF SURGERY

DAY OF SURGERY

Requirements to the operation theatre, OT:

IV Tranexamic Acid 2 g to OT. 1gm given after induction. If patient is underweight (<50kg). give 10mg/kg.

- Antibiotics: IV Cefazolin 2 g given at the time of induction (If patient allergic to penicillin group, to give IV Clindamycin 600 mg or IV vancomycin 15mg/kg infused over 1 hour and started when patient is called to OT).
- GXM 1 pint packed cell to OT. If patient has underlying end stage renal failure (ESRF), to prepare GXM 3 pints packed cell to OT.
- Occlusive dressing or PICO for high risk patient [6]

9 POSTOPERATIVE CARE

IMMEDIATE POST-OPERATIVE CARE:

The patient will receive a post-surgery management that include:

- Proper positioning of the limbs
- Adequate and appropriate pain management
- Wound site inspection
- Ensuring appropriate VTE prophylaxis
- Anti-microbial prophylaxis
- Monitoring for delirium

Nursing observations are to include but is not exclusive to:

- Vital signs
- Neurovascular chart
- Oral intake and fluid balance chart
- Pain score assessment
- Wound care
- Pressure area care

Positioning of limbs

Keep on abduction pillow

Prop up to 60 degrees after 6 hours post-surgery

Analgesia:

Ensure adequate analgesia, which may include:

- Patient Controlled Regional Anaesthesia(PCRA)/Patient Controlled Analgesia(PCA) as per Acute Pain Service protocol (if required)
- Paracetamol 1gm 6 hourly
- IV Tramadol 50 mg 8 hourly
- COX-2 inhibitors with caution if no contraindication [8]

Note: If still in pain after above medications, to inform APS team

VTE prophylaxis

Mechanical thromboprophylaxis – to start patient on pneumatic cuff

There is no good evidence that the use of graduated compression stockings prevents venous thromboembolism in patients with hip fracture. [10]

s/c Clexane 40mg OD to be started 12 to 24 hours post op if no evidence of bleeding and full dose to be administered on subsequent days.

Aspirin is the most appropriate agent for patients with standard Venous Thromboembolism (VTE) risk (total duration of prophylaxis 10-14 days). Direct oral anticoagulants (DOACs) or LMWH are the most appropriate agents for patients with elevated VTE risk (total duration 35 days). [22]

Antibiotic:

IV Cefazolin 1g 8 hourly for 24 hours

Other medications that may be required:

PO/IV Metoclopramide 10 mg 8 hourly

PO/IV Omeprazole 40 mg daily

POST OPERATIVE CARE

Post-operative care day 1

Check x-ray – Pelvis x-ray beam centered at symphysis pubis including proximal half of femur view and lateral view with abduction pillow.

Remove abduction pillow after x-ray.

Hip precaution is re-emphasized to the patient.[15]

Mobilisation should be facilitated day 1 post-surgery.

Start ambulation with walking frame if tolerable and not giddy. Allow full weight bearing unless specified by surgeon.

Wheelchair ambulation for patients who are not able to walk with walking frame.

Encourage chest physio and incentive spirometry.[16]

Remove surgical drain if present.

Removal of catheter once patient ambulates.

Early removal of urinary catheter ideally should occur 24 hours after surgery.

To check full blood count 6 hours post-surgery.

If haemoglobin less than 8 g/dl, decision to transfuse will be based on individual symptoms and medical condition.

Keep haemoglobin > 10g/dl for patients with ischemic heart disease.

Post-operative care Day 2

Encourage ambulation.

If outer dressing is soaked, to change dressing under aseptic technique.

Wound inspection by surgeon on day 3.

Wound Management

Wound inspection should be done on day 3 post-surgery by surgeon unless dressing is soaked through with blood or completely stained.
After wound inspection, wound is to be covered immediately with waterproof dressing.

Wound is subsequently inspected on day 7 and day 14 post-surgery by surgeon in the clinic during follow-up. Skin staples are removed in Joint Replacement Unit clinic on day 14 days post-surgery. Wound is not to be wet till day 15 post-surgery.

Note:

Antibiotic should be started if there is redness of wound or excessive discharge.
If wound discharges more than 7 days, wound washout will be done.

10

DISCHARGE PLANNING

Before a patient leaves hospital, the patient and their carer should be involved in the development of an individualised care plan that describes the patient's ongoing care and goals of care after they leave hospital.

FALLS ASSESSMENT

All patients presenting with a fragility fracture following a fall should be offered multidisciplinary assessment prior to discharge and intervention to prevent future falls. [1,4] Osteoporosis management should be started on patients unless there are contraindications.

All patients should be started on:

PO Calcium 1000mg daily

PO Vitamin D 800 iu daily

All patients presenting with fragility fracture should be assessed to determine their need for antiresorptive therapy to prevent future osteoporotic fractures. [1,4] Bone mineral density testing to monitor treatment efficacy should be considered in those who accept osteoporosis treatment.[2]

MULTIDISCIPLINARY DISCHARGE MANAGEMENT

Nutritional assessment:

Dietitian will perform a post-operatively assessment to determine the patient's dietary requirements and work with the patient and carer to ensure nutritional requirements are met with nutritional support after discharge.

Rehabilitation:

The physiotherapist will provide rehabilitation support with gait and balance education, strengthening, flexibility and endurance exercises to increase mobility, independence and prevent falls. Patient specific rehabilitation plan should be instituted including function and mobility goals once the patient has been discharged from the acute hospital environment. The nurse should fix an appointment with physiotherapy for the patient prior to discharge.

Home assessment:

The Occupational Therapist will work with the patient and carer to promote independence and safety in activities of daily living at home and prepare the patient for safe discharge. The identification of the need for support, equipment, home modification and other post discharge needs will be discussed.

Medication reconciliation:

The pharmacist will complete a medication review and reconciliation in collaboration with the clinician to determine appropriateness of medications. Patient and carer education pertaining to medications is vital prior to discharge. Adequate analgesics are to be prescribed until the next appointment in the clinic.

Nursing plans:

Patient will be given advice not to wet the dressing and to come immediately to the emergency department of HKL if the dressing gets soaked or pain increases in intensity despite analgesia given.

Patient can be discharged on day 3 post-surgery if the patient is able to ambulate and the wound is not inflamed.

POST OPERATION CLINIC FOLLOW-UP PROTOCOL

1 week post-surgery – for wound review

2 weeks post-surgery – for wound review and removal of stapler

6 weeks post-surgery – repeat x-ray, wound and function assessment

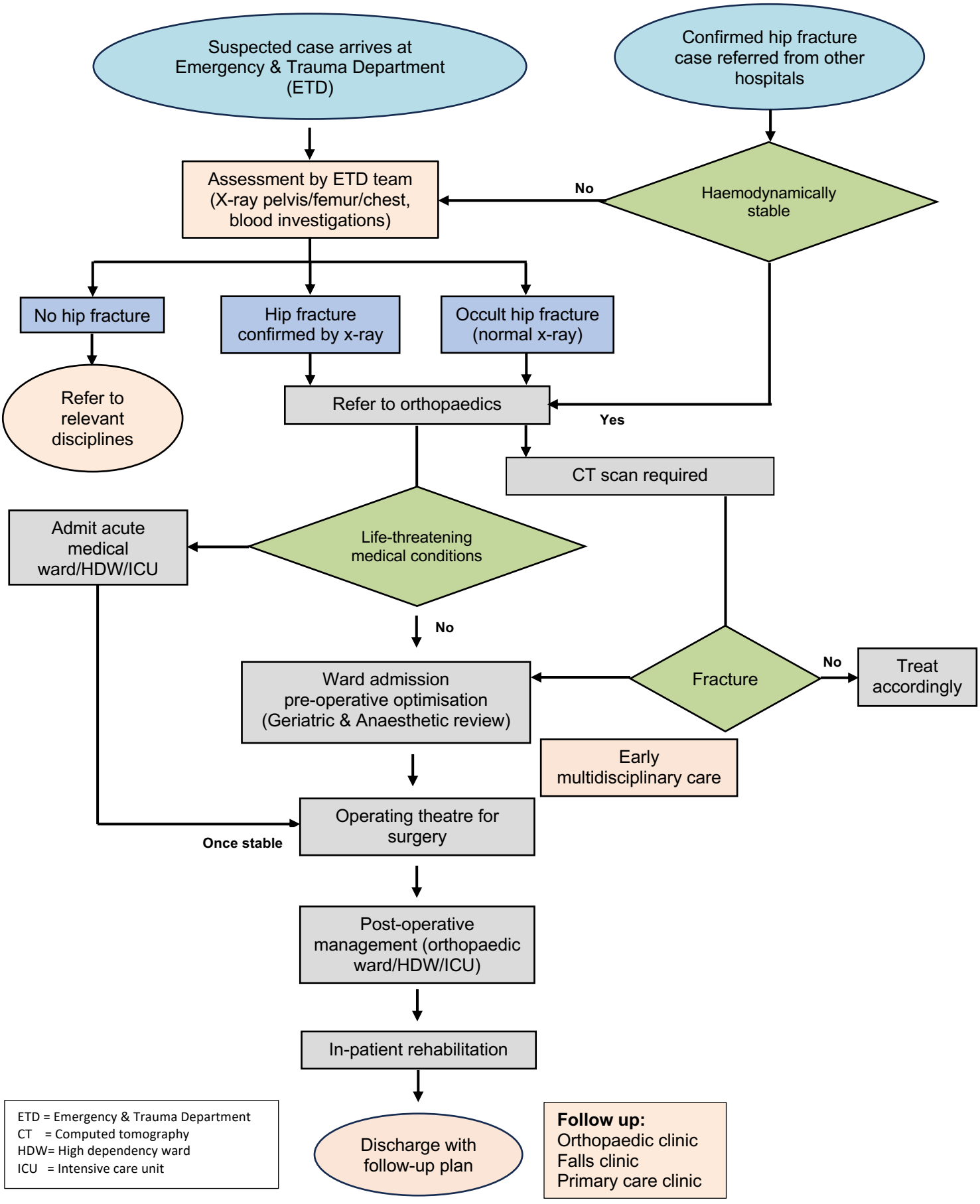
3 months post-surgery – repeat x-ray and functional assessment

- clinic appointment with Falls Clinic (Geriatric team)

6 months post-surgery – repeat x-ray

1 yearly – repeat x-ray

ALGORITHM ON MANAGEMENT OF HIP FRACTURE



ETD = Emergency & Trauma Department
CT = Computed tomography
HDW= High dependency ward
ICU = Intensive care unit

INDICATORS AND STANDARDS

INDICATOR CONCEPT	INDICATOR	TYPE	STANDARD
PAIN	PROPORTION RECEIVING PAIN ASSESSMENT AND MANAGEMENT	PROCESS	>75 %
EARLY OPERATION	PROPORTION OPERATED < 3 DAYS	PROCESS	>75 %
EARLY MOBILISATION	PROPORTION MOBILISED AFTER 24 HOURS OF OPERATION	PROCESS	>75 %
OSTEOPOROSIS MANAGEMENT	PROPORTION WHO ARE EVALUATED FOR OSTEOPOROSIS TREATMENT	PROCESS	>75 %
REOPERATION	PROPORTION WHO ARE REOPERATED WITHIN 1 YEAR	OUTCOME	<10 %
SURVIVAL	PROPORTION WHO ARE ALIVE AFTER 30 DAYS OF ADMISSION	OUTCOME	> 90%

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APPENDIX

FASCIA ILIACA COMPARTMENT BLOCK FOR GERIATRIC HIP FRACTURES

Fracture of the femur at the hip joint is a very common injury and is associated with significant morbidity and mortality. Patients with hip fracture tend to be in the older and have multiple medical comorbidities thus placing them at higher risk for complications especially chest infection, delirium, and heart failure. More than 95% of hip fractures are fall- related. Falls are the leading cause of death in adults over 65 years of age, with hip fractures being the most serious and costly injury resulting from a fall.

The reported pain intensity from a fractured hip can be between moderate to severe. The pain resulting from these fractures is well suited to regional techniques due to the anatomical location of these fractures. From a published systematic review of 83 studies addressing various analgesic options for hip fracture (including systemic analgesia, traction, multimodal pain management, and neurostimulation), the only intervention that was found to be effective at reducing acute pain was peripheral nerve block. Patients with hip fractures benefit from regional analgesia immediately on admission to the hospital both to provide comfort and reduce side effects of opioids. A recent study published in BMJ Open July 2021 conducted the feasibility of conducting complete nerve blocks by ED physicians after training and mitigate perceived barriers to more widespread adoption furthermore results from this study echoes existing safety and effectiveness of ultrasound guided regional anaesthesia.

Fascia iliaca compartment block (FIC) is known to offer fast and adequate pain relief with fewer adverse effects than systemic analgesia, especially in the elderly for hip fractures. The analgesic effect of fascia iliaca compartment block is superior to that of opioids during movement, resulting in lower preoperative analgesia consumption and a longer time for first request, and reduced time to perform spinal anaesthesia. The technique of fascia iliaca block is less technically demanding than femoral nerve block. Multiple studies have been conducted showing efficacy of this block and high success rates when performed in the Emergency department.

The common procedures used for this block include total hip replacement, hip fractures, or hip revision. Currently in Hospital Kuala Lumpur, Anaesthesia Department and Emergency Department are actively performing regional block for selected patients. To facilitate the revised management of geriatrics hip fractures pathway, a collaboration between the Geriatrics Department, Orthopaedics team, Anaesthesia Department and the Emergency Department has been put forth. As part of the agreed revised pathway includes the addition of the ultrasound guided fascia iliaca block for geriatric hip fractures.

FASCIA ILIACA COMPARTMENT BLOCK

The fascia iliaca is located anterior to the iliacus muscle (on its surface) within the pelvis. The femoral and lateral femoral cutaneous nerves lie under it. The rationale of the block would be to have a sufficient volume of local anaesthetic deposited beneath the fascia iliaca, even if placed some distance from the nerves, has the potential to spread underneath the fascia and reach these nerves. Potential spread underneath fascia iliaca towards the lumbosacral plexus has not been consistently demonstrated. Due to the spread that cannot be entirely controlled, this technique is mainly used for analgesia, not anaesthesia.

The fascia iliaca block offers both sensory (femoral nerve and its branches to the hip joint, the lateral femoral cutaneous ,and rarely the obturator) and motor block (quadriceps, sartorius and pectineus)in the distribution of the nerves reached by the local anaesthetic after injection underneath the fascia iliaca. The local anaesthetic of choice preferred would be long- lasting local anaesthetics most commonly used (bupivacaine 0.25%, levobupivacaine, and ropivacaine at higher concentrations of 0.2-0.3%). Since this block depends on the distribution of a high volume of local anaesthetic (20-40 mL) underneath the fascia, dilute concentrations of the long-lasting local anaesthetics are most commonly used. Currently Emergency Department Hospital Kuala Lumpur has the 0.2% concentration Ropivacaine vial. However in view of the nature of the fascia iliaca block where by the success of the block depends on the volume as well, ideally would be to purchase a higher concentration of the local anaesthetic agent and then dilute it into desired concentration.

Catheter techniques ideally for femoral nerve blocks are particularly valuable for geriatrics with hip fractures that may not receive their operative fixation within 48 hours or longer for various medical or logistic reasons.

Improved understanding of age-related changes in physiology, pharmacodynamics, and pharmacokinetics must be incorporated into any acute pain medicine care plan for older individuals. Several theories have been advocated to describe the multi-dimensional aspects and consequences of aging that underscores the complexities and difficulties encountered for optimal regional anaesthesia and analgesic for geriatric population. Therefore the potential risks and benefits of nerve block in geriatrics must be well understood and steps taken to manage its potential complications.

CONCLUSION

Fascia iliaca compartment block is an effective and relatively safe supplement in the preoperative pain management of hip fracture patients. A systematic review concluded that regional nerve blockades, including FIC seemed to be effective in reducing pain and decrease the incidence of delirium. Healthcare providers have become increasingly focused on providing effective management of acute perioperative pain in all patients, but especially older adults as the size of this patient population has steadily increased in recent years. Advances in anaesthesia and surgical techniques, an improving understanding of the pathophysiology of pain, the development of new opioid and nonopioid analgesic drugs, the incorporation of regional techniques that reduce or eliminate reliance on traditional opioid analgesics, and novel methods of drug delivery have all led to greater numbers of older patients undergoing major surgery.

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ROLE OF THE ALLIED HEALTH TEAM MEMBERS IN HIP FRACTURE CARE

FRACTURE LIAISON SERVICE/HIP FRACTURE CARE COORDINATOR

- The **Fracture Liaison Service Coordinator (FLSC)** will be responsible for identifying, investigating, and facilitating initiation of osteoporosis treatment and ensuring follow-up of treatment recommendations for all patients presenting to a hospital site with a fragility fracture.
- This includes both inpatients and outpatients from the Emergency Department or clinics. The FLSC will link with community primary care providers to ensure a smooth transition of care from the FLS program back into the community.
- Medical supervision for the FLSC position will be provided by the Orthopaedic Surgeon and the Geriatrician
- The FLSC will work cooperatively with all hospital staff and endeavour at all times to create minimal disruption to patient flow

SCREENING OF ELIGIBLE PATIENTS

- All patients over 60 years of age
- Identify those with eligible fractures: pelvis, hip - these are fractures most closely associated with osteoporosis
- Review orthopaedic admission list and notes

ROLE

- ***Identifying*** eligible patients
- Inform in Whatsapp group name list of new patients, which ward and what fracture every morning
- Acts as a ***central player*** in the establishing of patient connections: Orthopaedic surgeons, Geriatricians and all allied health members
- prepare name list of patients, which ward and what fracture and send via Whatsapp by Tuesday 2 pm
- communicate with the relevant parties of special requirements ie. expedite application for implant from JPA
- Participate in **multidisciplinary team meetings**, family meetings and other key meetings related to the FLS that support care coordination and effective communication.

PATIENT CARE

- Develop effective ***collaborative relationships*** with relevant medical, nursing and allied health personnel in the Departments
- responsible for enhancing their daily lives by building ***relationships with patients*** and families
- evaluating patients, casual or daily follow-up – any queries from patient

- help ***bridge the nursing gap*** by supporting identification, investigation, initiation of treatment and patient follow-up
- BMD is ordered
- Calcium, Vit D and osteoporosis medications started

DISCHARGE PLANNING

- Coordinate ***discharge planning***
  Able to provide key messaging to patients and families
  Education about osteoporosis and the need for Bone Mineral Density
  **Ensure BMD test is ordered*
- Advise on Vitamin D supplementation, calcium supplementation and osteoporotic treatment, where warranted
- Information Brochure from FLS program
- advice re post operation DOs and DON'Ts
- falls prevention
- Follow up of patients to ensure that everything is understood and those initiated on treatment are compliant (3,6 and 12 months)

RESEARCH

- Assist with ***research and data collection***

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ORTHOGERIATRIC NURSE

PAIN MANAGEMENT

- 24-hour monitoring of patients including assessment of pain, including pain during moving or rest by using pain scores. This assessment can be done 4 hourly and patient complains of pain
- Inform doctor if pain score more than 3, administer analgesic medication with right dose and frequency as per doctor's order
- Reassess pain score after medication administration to see the effectiveness of the medication, increase the dose or change the medication if pain has not resolve
- Support fracture site during turning or mobilizing to reduce pain

MONITOR AND MANAGE SYMPTOM OF DELIRIUM

- Monitor sign and symptom of delirium such as abnormal behavior, patient became hyperactive or hypoactive. Changes of behavior from pre-operation to post-operation
- Take history from relative or other nurses if patient was transferred from another ward, regarding changes of behavior, the medication, elimination behavior
- Doing assessment to detect delirium using CAM score or MMSE, inform doctor if had any changes to the score of assessment. (in Geriatric ward only)
- Manage cause of delirium such as:
    i. Constipation – ask patient to drink water enough and mobilize enough to help induce peristalsis. Check medication that induces constipation and ask doctor to discontinue or change it
    ii. Diarrhea – monitor cause of diarrhea such as medication or nutritional supplement
    iii. Infection (ie. operation site, UTI) – by using antibiotic and dressing using aseptic technique at the operation site to prevent or treat the infection. Check sign and symptom of infection at wound site, asking patient had any pain during passing urine
    iv. Acute urinary retention – do bladder scan first to monitor volume of urine in bladder if available, helping patient passing urine using hot or cold compress at bladder site. Insert CBD if required as last resort
    v. Pain – assess pain level and give analgesic accordingly and per doctor's order

NUTRITIONAL AND SUPPLEMENT

- Doing assessment of nutritional status patient during history taking such as consistency of food, volume of food taken and type of food that patient is able to eat
- Monitor nutritional intake of patient and record into intake output chart
- Suggest to doctors to refer to the dietitian for oral nutritional supplement if patient is not taking enough food daily

PREVENTING AND MANAGEMENT OF PRESSURE INJURY

- Do a head-to-toe physical examination daily to monitor and detect sign and symptom of pressure injury and any abnormalities of skin
- Place ripple mattress for offloading of pressure
- Diapers change regularly when wet and clean thoroughly
- 2 hourly repositioning of patient if patient is not mobilising

ASSIST IN EARLY MOBILIZATION

- Assist physiotherapist in early mobilizing of patient, nurses must know the **dos and don'ts** with regards to mobilization (ie. such as crossing the leg for patient with total hip replacement and all other positions that are not permissible)
- Assist with simple exercises (as per prescribed by the physiotherapist) when the physiotherapist are not around during the weekend
- Monitor patient during mobilization, and ensure the patients do the exercise to encourage mobilization

DISCHARGE PLANNING

- Plans during multidisciplinary meeting weekly should be carried out
- Planning for home visit with multidisciplinary team to make sure patient's home environment, nutritional status, risk of fall and medication intake is taken care of

Home visit: Assess patient at home such as vital sign, memory assessment, visual acuity and postural blood pressure to make sure patient risk of fall is addressed

NURSE AS EDUCATOR AND COORDINATOR

- Nurses act as coordinators among doctors and allied health as nurses spend the longest hours with patients
- Nurses also has a role to teach and train patients and caregivers (ie. safety, risk of falls, wound care, nutrition)

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PHARMACIST

Pharmacists are trained to conduct thorough medication reviews, consisting of an appraisal of age-related physical changes that predispose older adults to drug-drug interactions, drug-disease interactions and medication side effects. Medication use is one of the most highly modifiable risk factors for falls in older adults.

Polypharmacy, known as the use of multiple medications or the administration of more medications than is clinically indicated, is common in older adults. Approximately 85% of older adults take at least one prescription medication and about 25% take 5 or more types of medications. Therefore, a routine medication review is a key component in preventing falls in older adults.

Pharmacists can also provide added value services in the prevention and treatment of falls related fracture. They are well trained in assisting clinicians to screen eligible patients for antiresorptive initiation and treatment monitoring. In addition, pharmacists have important roles in advocating the patients/ carers and related health care professionals on the management/ monitoring of antiresorptive agents in patients with severe osteoporosis.
To date, there is no established pathway in Malaysia to guide pharmacists in performing comprehensive medication management that incorporates a fall-oriented assessment and intervention. This process would require involvement by trained pharmacists from various levels and facilities to ensure the continuity of care as the patient transits between settings.

ASSESSMENT AND INTERVENTION PROCEDURE

1. Referral is received from the clinician.
2. Medication review, evaluation and optimization is performed by the pharmacist by comparing the medication history (CP1) and current inpatient medications.
3. High-risk drugs and falls-risk increasing drugs (FRIDS) are identified and patient's suitability for active antiresorptive treatment is assessed.
4. Intervention measures are initiated based on the issues identified.
5. Patient is reassessed post-intervention.
6. Counselling and education on use of medications and changes in medication regime are given to the patient before or upon discharge.

ASSESSMENT MODALITIES

1. **Medication Appropriateness Index (MAI)**

This tool helps evaluate the appropriateness of individual medications and medication regimes in older adults in terms of indication, efficacy, dosing, administration, drug-drug and drug-disease interactions, medication duplications, duration of therapy and cost-benefit ratio.

2. Tools for identification of potentially inappropriate medications, especially FRIDS

a. **Beers Criteria 2015**

The Beers Criteria is used to identify potentially inappropriate medications (PIM) in older adults. It contains a list of PIMS and recommendations for prescribing.

b. **Screening Tool of Older People's Prescriptions (STOPP)**

This tool is used to minimize inappropriate prescribing in older persons. It is best used during acute illness or hospital admissions to prevent adverse drug reactions (ADR).

c. **Anticholinergic Burden (ACB) Scale**

The ACB measures the risk of anticholinergic effects of prescribed and over-the counter medications.

3. **Screening Tool to Alert to Right Treatment (START)**

This tool helps to identify necessary medications that may have been missed, such as osteoporosis medications.

4. **Managing Anti - Osteoporosis Safety and Efficacy (MOSE)**

This tool is used to screen patient's suitability for antiresorptive initiation based on the screening and monitoring checklist.

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PHYSIOTHERAPIST

The physiotherapy management begins on the day of admission to the ward from pre operative, post operative and continues after discharge. The objectives of physiotherapy encompass the prevention of contractures, enhancement of patient education and fortification of the muscles surrounding the hip joint via regulated activities.

Physiotherapy effectively improves strength, motor function and balance in older adults at risk of falling and those with fall-related injuries Physiotherapists assess individuals to screen for risk and management of falls. Physiotherapists prescribe specific exercises, activities and interventions and provide advice on managing environmental risks.

When the hip's condition permits, a preoperative exercise regimen will be taught to enhance the breathing exercise to prevent the complications such as pneumonia and atelectasis.
Following surgery, patients are advised to regularly engage in deep breathing exercises and employ an efficient coughing technique to prevent pulmonary congestion and the collapse of bronchioles in the lungs.

ASSESSMENT AND INTERVENTION PROCEDURE
IN PATIENT

1. Referral from Orthopedic ward or clinic.
2. Assessment performed by the physiotherapist:
    I. Chest assessment
    II. Pain Assessment
    III. Mobility assessment
    IV. Strength assessment
    V. Equipment/ assistive device selection
    VI. Cognitive screening in term of safety ambulation (Mini- Cog)
3. Physical and cognitive issues are identified
4. Intervention measures are initiated based on the issues identified
5. Patient is reassessed post-intervention

Post-Operation aims:

- Minimize the pain (non-chemical pain relief)
- Airway clearance and improve breathing effort
- Enhancement of range of movement
- Establishment of the lower Limb muscle activation
- Restoration of independent functional mobility
- Education regarding the prevention of dislocation
- Ambulation before discharge (weight bearing status as per prescribed by surgeons)

Target first week postop:

- Effort tolerance
- Mobilization
- Transfer
- Gait
- Range of Motion
- Strength
- Balance

OUTPATIENT

Recommended assessment:

- 5 times sit to stand test
- Time up and Go test
- Lower limb muscle strength/Power
- Verbal rating scale for pain
- Gait speed
- Fall efficacy Scale

Intervention during outpatient

Structured exercise

- Progressive, high-intensity resistive strength
- Balance training
- weight-bearing
- functional mobility training

Structured exercise for older persons with cognitive impairment

For patients with mild to moderate dementia (carer training)

- progressive, high-intensity resistive strength,
- balance,
- weight-bearing,
- functional mobility training

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OCCUPATIONAL THERAPIST (OT)

Occupational therapy facilitates optimal occupational performance and community participation across the full spectrum of ability. OT's are one part of multidisciplinary team effort to reduce falls in older persons in healthcare setting and in the community. Assessment and Interventions to achieve functional outcome and reduce falls in older persons are mainly directed at improving participation in daily activities and improving home safety.

ASSESSMENT AND INTERVENTION PROCEDURE

IN PATIENT/ OUT PATIENT:

1. Referral received from the medical officer from Ward Orthopedic and Clinic.
2. Assessment performed by the occupational therapist:

    i. Activity of Daily Living (MBI Assessment)
    ii. Cognitive assessment; i.e. orientation
    iii. Splinting modalities
    iii. Equipment/ assistive device prescription
    iv. Environmental Hazards identification for home – pre/post discharge
    v. Home visit – for outpatient only

3. Identification of physical and cognitive issues
4. Intervention measures are initiated based on the issues identified
5. Reassessed post-intervention

INTERVENTION MODALITIES

1. Reality orientation training
2. Activities of daily living retraining
3. Splinting and assistive device/ equipment prescription
4. Environmental modification
5. Education for patients and caregivers regarding the importance of appropriate clothing, footwear and walking aids
6. Assisting patients in transitioning back to their community while optimizing their functional abilities

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DIETITIAN

Dietitians play a key role in the prevention and management of nutrition-related disorders in older adults. As a member of integrated multidisciplinary teams, dietitians apply scientific evidence to the promotion of healthy eating, individualized nutritional therapy and counseling to the individual older adults.

NUTRITION SCREENING

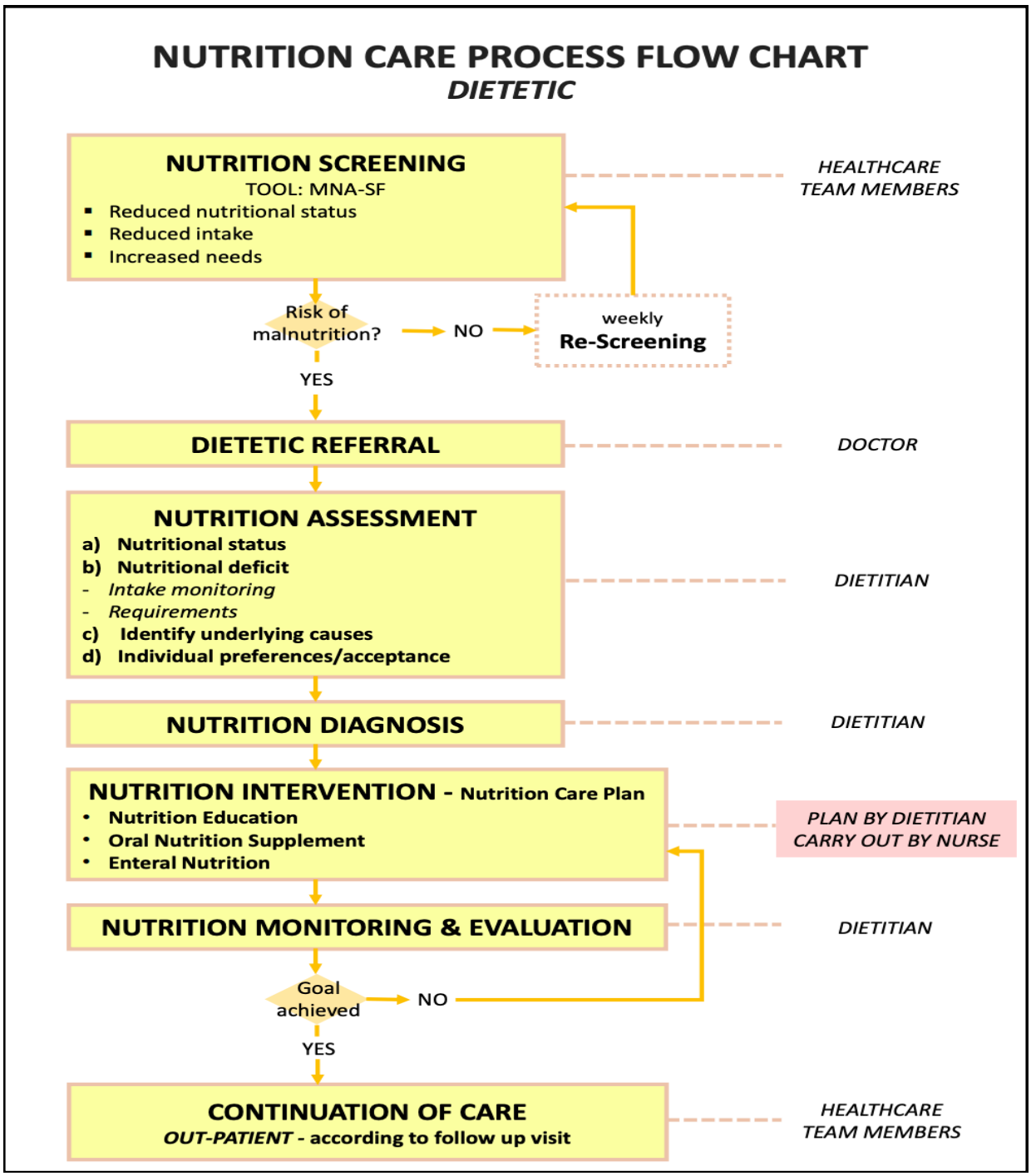
1. Nutrition screening will be performed by a Healthcare Team Member (using the validated screening tool, MNA-SF) during an admission or every clinic visit to identify risk of malnutrition based on components:
a. reduced nutritional status
b. reduced intake and/or
c. increased needs
2. Those who are at risk of malnutrition, will be referred to a Dietitian.
For those who are not at risk of malnutrition, re-screening will be done on a weekly basis.

NUTRITION ASSESSMENT AND DIAGNOSIS

1. Received a referral from the Medical Officer from Orthopedic Ward and Clinic.
2. Nutritional assessment is performed by the dietitian:
a. Nutritional status
b. Nutritional deficit
   i. Intake monitoring
   ii. Requirements
c. Identify underlying causes
d. Individual preferences/acceptance
3. Nutrition diagnosis consists of problem, etiology and symptom.

NUTRITION INTERVENTION, MONITORING AND EVALUATION

1. Provide nutrition intervention to the patient:
a. Nutritional education, or, and,
b. Oral nutritional supplement (requires Nurses' involvement in preparing and feeding the patient), or,
c. Enteral nutrition feeding regime (requires Nurses' involvement in preparing and feeding the patient)
2. Monitor whether nutrition intervention has achieved the goal or not
a. If YES, continue the nutrition care and follow-up visit during outpatient clinic according to the Healthcare Team Member arrangement.
b. If NO, re-assess and revise the nutrition intervention



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