



Systematic Review / Meta-analysis

Evidence-based perioperative pain management protocol for day case surgery in a resource limited setting: Systematic review

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ABSTRACT

Background: Worldwide, there is an increasing trend of performing more complex operations in a day care setting, usually driven by economic considerations. Provision of appropriate pain relief is still inadequate in this setting. Poor pain control and adverse effects of opioids provided for pain control are common reasons for readmission, with human and economic consequences. The aim of this review was to develop evidence-based protocol for pain management of day surgery in a resource limited setting.

Method: After formulating the key questions, scope, and eligibility criteria for the articles to be included, advanced search strategy of electronic sources from data bases and websites was conducted. Screening of literatures was conducted with proper appraisal checklist. This review was reported in accordance with preferred reporting items for systematic reviews and meta-analysis (PRISMA) 2020 statement.

Results: A total of 333 articles were identified from data bases and websites using an electronic search. 45 articles were removed for duplication and 87 studies were excluded after reviewing titles and abstracts. At the screening stage, 73 articles were retrieved and evaluated for eligibility. Finally, 40 studies met the eligibility criteria and were included in this systematic review.

Conclusion: Day surgery encourages patients to mobilize soon after surgery and empowers them to manage their own pain. Thus, preoperative patient education and high-quality perioperative pain management are paramount. With increasing healthcare demands for more day-case procedures, multi-modal analgesic techniques in the perioperative period with good extension of analgesia into the postoperative discharge period are essential.

1. Introduction

The association of anesthetists of Great Britain and Ireland (AAGBI) defined day case surgery as the patient is admitted and discharged from hospital on the same day of surgery [1]. Day case surgery has become a popular modality of surgical intervention throughout the world. Numerous factors including the economic and financial issues are driving this therapeutic modality to a widespread acceptance among surgeons and anesthetists. Anesthesia for day case (ambulatory anesthesia) surgeries may require administration of general, regional, and local anesthesia or monitored anesthesia care supplemented with sedation with adequate pain management [2].

Recent advances in anesthetic and surgical techniques, along with escalating healthcare costs, have resulted in an increasing number of

surgical procedures being performed on a day case basis worldwide. In North America, data showed that 60–70% of all surgeries were performed on a day case basis [3].

One of the driving forces for the wide growth of day case surgery is the high level of pain management modalities. Despite the advances in anesthesia techniques that have minimized intraoperative pain and diminished the associated postoperative pain, the incidence of moderate to severe post discharge pain is approximately 25–35% [4].

The prevalence of pain after ambulatory surgery remains high in most developed countries and significantly higher in developing countries. According to a prospective cross-sectional survey done in Kenya, the prevalence of postoperative pain after day care surgery was 58% within 30 min postoperatively, 55.3% after 24 h, and 34.7% after 48 h following surgery. The prevalence of moderate to severe postoperative

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Table 1
Level of evidence and degree of recommendation, Good clinical practice, GCP, WHO, 2011.

Level of evidence	Types of evidence	Degree of recommendation
1a	Meta analysis, systematic review of RCTs, Evidence based guidelines	Strongly recommended and directly applicable
1b	Systematic review	Highly recommendable and directly applicable
1c	Randomized control/clinical trials	Recommended and applicable
2a	Systematic review of cohort or case control studies	Extrapolated evidence from other studies
3a	Non analytical studies like case report and case series, clinical audit, commentaries and expert opinions	Extrapolated evidence from other studies

pain was 13% after 24 h, and 11.7% after 48 h [5].

After discharge home, approximately one-third of day case surgery patients continue to experience moderate-to-severe pain. The pain is often worse on the second postoperative day when patients start to mobilize. All patients should therefore be discharged home with an adequate supply of analgesia with clear instructions for regular administration and to alleviate break through pain [6]. The aim of this evidence-based protocol is to improve pain management practice of day case surgery in a resource limited setting.

2. Rationale of the review

Advancements in both anesthetic and surgical techniques have led to an increased number of procedures performed in an ambulatory setting.

A synergistic and proactive approach is required by the entire healthcare team to help expedite patient recovery and facilitate a resumption of normal activity after surgery. Pain is one of the main postoperative adverse outcomes that causes distress to patients, prolongs their stay in the ambulatory care unit, and increases the incidence of unanticipated admission after surgery. Development and Continued implementation of evidence-based, standardized analgesic protocols will further improve patient care and outcomes.

Recent guidelines on day-case surgeries, all recommend a high level evidence based pain management protocol to improve pain management in low income countries. However, most of the guidelines developed for anesthesia management of day case surgeries, are ambiguous on the specific management of pain in the perioperative period. Moreover, the incidence of postoperative pain is still high as reported by many literatures. Therefore, this local evidence-based protocol will guide to reduce the incidence of pain and improve the practice of pain management of day case surgical procedures in a resource limited setting.

3. Methods

3.1. Search strategy

After formulating the key questions, scope, and eligibility criteria for the evidences to be included, a comprehensive search strategy of electronic sources was conducted. Terms like ‘pain’, ‘pain management’, ‘day case surgery’, and ‘ambulatory surgery’ were keywords of the review question. Synonyms of the keywords were identified from national library of medicine via medical subject headings (MeSH) browser. Keywords were combined by a boolean operators “AND” or “OR”

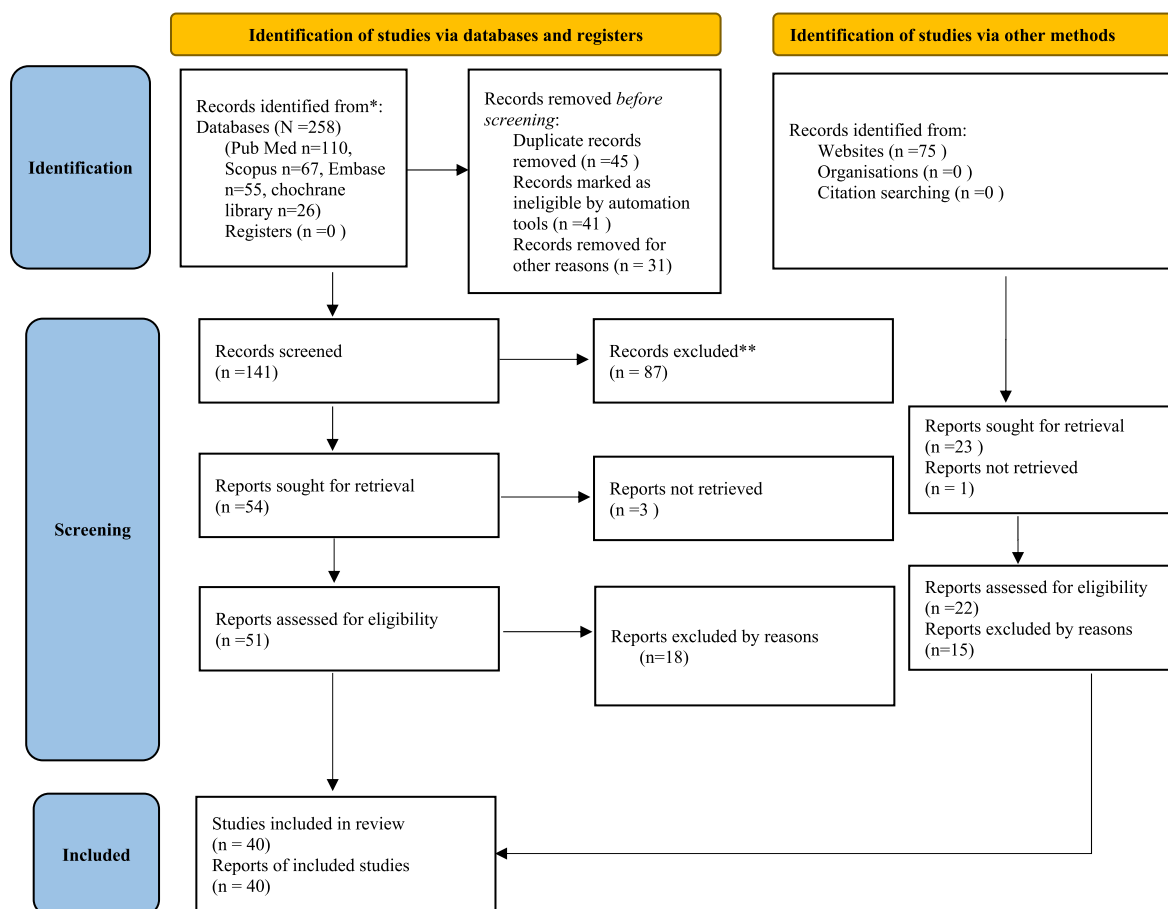


Fig. 1. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020.

appropriately. We applied search terms in combination as: 'pain OR pain management' AND 'day case surgery' OR 'ambulatory surgery'.

The literatures were searched using advanced searching methods from data bases like cochrane library, Pub Med, scopus, embase and websites such as google scholar. The electronic literature search was performed from 7 May 2022 to 21 May 2022. All of the accessible studies that had been published in English language from inception up to 21 May 2022 were included in this systematic review.

Duplication of literatures was removed by Endnote. Further screening of literatures was conducted based on the level of significance by proper appraisal of the title, abstract and full text of the articles. A total of 40 articles were included and reviewed. The strength of evidence and grade of recommendation was made based on WHO 2011 level of evidence (Table 1).

This review was reported in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020 criteria [7] (Fig. 1). This review was registered in research registry with unique identifying number of reviewregistry7948.

3.2. Eligibility criteria

All studies related to pain management protocols for a day case surgery reported in English language, with full text available for search and conducted across the globe were included in this systematic review. Those studies that reported duplicated sources, unrelated research, case reports, and articles without full text available with attempts to contact the corresponding author via email were excluded in this systematic review.

3.3. Study selection

Three independent authors selected the candidate articles for the study, which were exported in to Endnote reference manager software to remove duplicates, and independently screened the titles and abstracts (BA, MM, and NR). Any disagreement was resolved through discussions lead by a third author.

3.4. Study quality assessment

The two independent authors appraised the standard of the study using AMSTAR 2 methodological quality appraisal checklist. Any disagreement was discussed and resolved by the authors. The critical analysis checklist has 16 parameters [8]. The quality of this review after critical appraisal of its method was reported as high.

4. Results

4.1. Study selection

A total of 333 articles were identified from data bases and websites using an electronic search. Of these articles, 45 were removed for duplication and 87 studies were excluded after reviewing their titles and abstracts. At the screening stage, 73 articles were retrieved and evaluated for the eligibility. Finally, 40 studies related to pain management for day case surgery were included in this systematic review (Fig. 1).

4.2. Description of included studies

Out of 73 articles retrieved, 40 studies met the eligibility criteria and were included in the final systematic review. Out of all articles included, 6 were systematic reviews and meta-analyses, 15 were systematic reviews, 4 were cross-sectional studies, 7 were guidelines, 6 were cohort studies and 2 were controlled trials.

5. Literature review

According to the British Association of Day Surgery (BADs), there is an updated 'Directory of Procedures' published in 2006 which is now in its fourth edition and contains 200 procedures across all surgical specialties that are candidates for day case surgery [9]. Many of these day case surgeries including excision of breast, simple mastectomy, Sentinel node biopsy, axillary clearance, gynecology operations like incontinence, endoscopic resection of prostate (TURP), cholecystectomy, repair of a range of hernia, tympanoplasty and tonsillectomy [2].

To have a successful day case surgery, there are multiple factors to consider: day surgery enthusiasts, a robust day surgery pathway, and motivated patients [9]. There are generally accepted criteria for patient selection with very few absolute contraindications. Recent advances in surgical and anesthetic techniques have changed the criteria for day case surgery patient selection. The historical limitations on patient groups such as age, body mass index (BMI), or the arbitrary American society of anesthesiologists (ASA) status are no longer necessary [9,10].

The BADs has listed out surgical factors that are important to be a candidate for day case surgery. Some of these factors include: controlled postoperative pain with oral analgesia or regional anesthesia techniques, less invasive procedure with little to no significant risk of major postoperative complications necessitating immediate medical intervention (hemorrhage, cardiovascular instability and severe pain) and enable rapid resumption of patients to normal functions (oral nutrition, safe mobilization) [9,11]. This shows that pain not only affects the postoperative patient outcome but it is also a criterion for patient selection in day case procedures.

Recent advances in anesthetic and surgical techniques along with escalating health costs have resulted in an ever-increasing number of surgical procedures being performed on a day-case basis. The cost-effectiveness of ambulatory surgery is well recognized. Such patients have usually been operated in a "minor" theatre under local anesthesia. In India, among all surgical specialties, less than 15% of cases operated are true cases. The bulk of these patients come from specialties of ophthalmology and ENT, followed by gynecology and general Surgery [12].

Day case surgeries should be done in designated self-contained unit that is functionally and structurally separated operating theatres. It should have its own reception, consulting rooms, ward, theatres and recovery area, together with administrative facilities. The recovery areas should be equipped and well-staffed to the same standards as an inpatient facility to provide rapid turnover time and ensure the maintenance of a patient's privacy and dignity at all times. Side rooms are particularly useful when caring for patients requiring an increased level of sensitivity, such as those with special needs [1].

The other major structure needed to have a successful day case surgery program is proper timing strategy. Speed is one of the advantages of day case procedures with little waiting time starting from preoperative to the postoperative and discharging time [13]. However, studies on patient's experience have shown that longer waiting time in the preoperative period causes negative experience and increases pain perception in the postoperative period [13,14].

One of the major advantages of day case surgeries is the ability to control the patient's pain before hospital discharge. A cohort study by Beaugard et al. showed that 40% of patients reported moderate to severe pain during the first 24 h after hospital discharge. The major contributing factor for the uncontrolled pain at home was inadequate pain relief in the first few hours after surgery and unclear or invalid instruction given to care givers on pain management [15].

Postoperative pain therapy after ambulatory surgery is a challenge. It requires effective analgesic techniques with minimal side effects, which can be easily managed at home and are intrinsically safe for the patient. In developed countries prevalence of postoperative pain following day care surgery is variable ranging from 30 to 40% [15,16].

Pain after ambulatory surgery were significantly higher in a cross sectional study done in the Netherlands showing 26% of the patients who came in as an ambulatory cases had moderate to severe pain specially operations of the nose and pharynx, abdominal operations, plastic surgery of the breasts, and orthopedic operations [17].

The prevalence of postoperative pain after day care surgery in low income countries remains relatively high.

Adequate postoperative analgesia is a prerequisite for successful ambulatory surgery. Recent studies have shown that 30–40% of discharged ambulatory surgical patients suffer from moderate to severe pain during the first 24–48 h [4]. This type of pain has several complications mainly pertaining to day case surgery including: interfere with sleep and daily functioning, anxiety, delayed discharge, contact with general practitioner and the main reason for unanticipated hospital admission [18].

According to a survey done on 5703 ambulatory surgical patients in Toronto, Ontario, Canada, the main reasons that affected the patients' ability to manage pain at home were: patients reported prescriptions were not properly explained to them; patients waited too long before taking their pain medication; patients did not understand the prescription; and patients were afraid to take the pain medication, thinking that it was addictive [19]. This shows that knowledge of the patient about the management of their postoperative pain at home significantly affects the level of pain perceived and the satisfaction of the patient towards the hospital care received.

Several predictive factors have shown to cause increment in pain after day case surgery. A study done by Gramke et al., showed that the presence of preoperative pain, anticipated postoperative pain by the clinician, preoperative high expectations of postoperative pain by the patient, younger age, and fear of short-term consequences of the operation were common factors for postoperative increased pain level after day case surgeries [20].

6. Areas of controversy

In ambulatory surgery, the technique of anesthesia is based on several factors. One of these factors is the ability of the patient to be discharged according to the discharge criteria. This is where the controversy of regional versus general anesthesia comes to play. It is clearly known that both spinal and general anesthesia have their own merits and drawbacks and in the early years of day case surgery general anesthesia was the preferred technique for most ambulatory surgery because of rapid recovery, slight agitation and behavioral disorders, avoids risks of failure of regional blocks, residual paralysis and less chance of side effects like post-operative nausea and vomiting if TIVA is used as a general anesthetic technique. However, it has disadvantages of anesthesia machine pump failure, disconnection and awareness and use of N₂O is associated with increased risk of post-operative nausea and vomiting [21].

Central neuraxial and regional anesthesia techniques have recently been shown to have a superior advantage in lower extremity, abdominal and gynecological procedures. When used with subclinical doses of local anesthetics and adjuvants, they have fast recovery profile [18]. It also has a superior lower pain score compared to general anesthesia and avoids the need for un wanted airway manipulation and sedation [22]. However, a cross sectional study on postoperative pain predictive factors after day case surgery showed that regional anesthetic technique decreased the risk of acute postoperative pain only on the day of the operation [20] and moreover, the use of central neuraxial block has increased the discharge time and affects patient's early discharge to home [1].

Another controversy in day care surgery is the start of fluid intake and postoperative voiding before discharge. Guideline done in 2011 on day care surgery, stated a post anesthesia discharge score (PADS) of 2 for those who have taken PO and voided as a discharge criterion [23].

When advising patients on postoperative pain management

regiments including the dosage and type of medication they can use for different intensity of pain, the adherence of the patient and their care givers varies which will result in different outcome. Some patients tend to decrease the dose of the prescribed medication with fear of developing addiction resulting in unplanned admission to hospital for acute and severe pain [17]. Some authors also suggest an aggressive multimodal pain management technique can be used while the patient is still in the hospital to minimize the severity and duration of pain, they will experience at home [24–26].

7. Discussion

Untreated pain remains a serious problem for the day case surgery and is virtually the biggest constraint for patient to meet discharge criteria in the expected time. In fact, postoperative acute pain next to hemorrhage is one of the most commonly cited reasons for postoperative readmission rates [27]. Therefore, there is a greater need to develop protocol to manage pain in a safe and practical way after day case surgery.

7.1. Preoperative evaluation

A protocol review stated that preoperative evaluation by the anesthesiologists, ideally through the preoperative clinic should be encouraged for patients that may be difficult to manage using the standard multimodal analgesia protocol. High-risk patients to postoperative pain include: patients with chronic pain who are already on high doses of pain medication, patients at risk of perioperative anxiety and those surgeries with expected high level of pain intensity [20,28].

7.2. Perioperative strategies to reduce pain

Multimodal analgesia refers to the use of multiple pain management strategies. This is a combination of pharmacological, regional nerve block, and non pharmacological interventions via variable mechanisms and sites of action in the peripheral and central nervous system. Multimodal analgesia has additive or synergistic effects that improve analgesia, a reduction in opioid requirements ("opioid-sparing effect") and diminution in adverse effects of opioids in the postoperative period [29].

7.3. Choice of analgesia

7.3.1. Primitive analgesia

A review article explained that preemptive analgesia is the administration of analgesia before surgical incision. The underlying assumption is that secondary to any peripheral injury or inflammation, there is central sensitization which embraces a number of different and complex neurobiological changes that lead to increase pain sensitivity [25].

7.3.2. Paracetamol

Paracetamol is a mild analgesic with few side-effects and has in studies been demonstrated to have an opioid-sparing effect. As oral paracetamol is 80–90% absorbed from the gastrointestinal tract, it is nearly as effective as the i.v. formulation. Oral paracetamol displays peak plasma concentration within 30–60 min; i.v. paracetamol instantaneously with onset of pain relief after 5–10 min. There is a possibility of higher risk of toxicity from i.v. paracetamol in patients with renal or hepatic insufficiency [6].

7.3.3. Dexamethasone

The use of dexamethasone on decreasing postoperative pain score and opioid use has been studied by multiple researchers to with similar premise. A meta-analysis of RCT done by Gilda' sio S. et al. showed that preoperative administration of dexamethasone at a dose greater than 0.1 mg/kg reduces postoperative pain as well as opioid consumption postoperatively [30]. This study is also supported by a meta-analysis

done by N. H. Waldron et al. perioperative single-dose dexamethasone was associated with small but statistically significant reductions in postoperative pain, postoperative opioid consumption, need for rescue analgesia, PACU stays, and a longer time to first analgesic dose [31].

A systematic review on techniques to optimize multimodal analgesia in ambulatory surgery done in 2017 showed similar findings with the previous reviews that preoperative or intraoperative use of dexamethasone at doses of 0.1 mg per kilogram or greater has been found to reduce postoperative nausea, pain, and opioid. It has been proven to be an effective adjunct in ambulatory surgery within the multimodal approach to nausea and vomiting and pain [32].

A systematic review done in 2019 also showed that dexamethasone is also associated with reduction in pain scores during mobilization post-operatively. Dexamethasone as part of a multimodal analgesia plan, high-dose (>0.2 mg/kg) had opioid sparing effects and delay time to first postoperative analgesic request when used in conjunction with peripheral nerve block [28].

7.3.4. Regional anesthesia

The use of regional anesthesia in day care surgery has long been a debate in comparison to general anesthesia as to which technique is superior. It is a well-known fact that regional anesthesia has an advantage of avoiding most of the general anesthesia related complications including sedation, nausea and vomiting, airway complications and postoperative cognitive dysfunction.

In a meta-analysis of RCT done to compare regional versus general anesthesia for ambulatory anesthesia stated that regional anesthesia and peripheral nerve block have an advantage of reducing postoperative pain score, nausea and vomiting and patient satisfaction although it does not decrease the overall ambulatory care unit time [33]. The choice should be mainly based on patient specific history and concerns and surgical factors weather to use central neuraxial blocks or regional anesthesia.

A review article stated that the use of regional anesthesia for ambulatory surgery is undebatable. Its efficacy and duration could be extended by adding adjuvants to single-bolus peripheral nerve blocks, otherwise the limited duration of effect results in development of pain soon after discharge [34].

The use of local anesthetics in central neuraxial blocks could impair motor function while providing analgesia; this may impair early ambulation and initiation of physiotherapy. Hence, addition of adjuvants such as clonidine, dexamethasone, buprenorphine, and midazolam may be beneficial [22,34].

7.3.5. Lidocaine infusion

Lidocaine has a dual action as a local anesthetic and an anti-inflammatory and it helps to reduce the incidence of postoperative persistent pain, enhances gastro-intestinal motility and has an opioid sparing effect. It is considered as part of multimodal analgesia in patients who undergo abdominal and major surgery. It is not given as infusion to patients who receive antiarrhythmic drugs e.g., amiodarone, disopyramide, quinidine and in the absence of ECG monitoring. A double blind randomized controlled trial by Duvuru Ram et al. Showed that the total morphine requirement, median VAS score, first analgesic requirement time in the first 24hrs period were significantly less in patients who received IV lidocaine infusion of 2 mg/kg/hr than those who received intraperitoneal injection for ambulatory surgery [35].

A systematic review of analgesia for ambulatory surgery showed that Intravenous lidocaine 2 mg/kg/h can lower pain scores. The patient also experienced fewer complications after 30 days of postoperative period [28].

7.3.6. Non-opioid analgesics

There are a variety of non-opioid pharmacologic interventions that can be done in the preoperative period to help ameliorate the intraoperative and postoperative pain response. Acetaminophen has a not

completely understood mechanism of action, but is noted to be a potent inhibitor of COX-2 with both central and peripheral analgesic effects. A review article stated that acetaminophen is a weak non-opioid medication, however it has also a very low rate of adverse effects as long as used in therapeutic doses <4 g/day, it has nearly no contraindications [34].

A review study narrated that non steroidal anti-inflammatory drugs (NSAIDs) including selective COX-2 inhibitors are also commonly used in the preoperative period. Selective COX-2 inhibitors can be more expensive than other commonly used NSAIDs; however, they are less likely to cause gastrointestinal irritation or impaired hemostasis [32].

Overall use of non-opioids is clearly stated in a systematic review of postoperative pain management following ambulatory anesthesia, its challenges and solutions where these medications can be a component of multimodal analgesia after ambulatory surgery and can contribute to improved analgesia and reduced opioid side effects through their opioid-sparing effects [34]. The selection of the most suitable non opioid for a specific patient should be governed by the severity of pain, comorbidities, and, thereby, contraindications and drug availability in the respective setting.

7.3.7. Opioids

The analgesic effect of opioids has to be balanced against an array of unpleasant side-effects; namely nausea and vomiting, sedation, pruritus, respiratory depression, constipation, and urinary retention. The administration of long-acting opioids remains a mainstay of pain management, but it is an important contributor in delaying discharge and recovery because of the high incidence of postoperative nausea and vomiting. Shorter acting opioids, such as fentanyl, may be preferred for day-case surgery attributable to only half the incidence of post-discharge nausea and vomiting compared with morphine [36]. A reliance on opioids for perioperative pain management may in some patients cause acute opioid-induced hyperalgesia. As is well established, therefore multi-modal analgesia is preferable and indiscriminate use of long-acting opioids is discouraged [37].

7.3.8. Ketamine

Ketamine is a non competitive NMDA receptor antagonist. It modulates central sensitization induced by incision and tissue damage. It also possesses preemptive analgesic properties. A systematic review showed that when ketamine is used in small doses (0.1–0.2 mg/kg), it has opioid-sparing effects, less incidence of adverse events, and better patient and physician acceptance. A single bolus of ketamine (0.1–0.15 mg/kg) intravenous has significant opioid-sparing effects after painful orthopedic and intra-abdominal procedures [25].

7.4. Early oral fluid intake

Early oral fluid intake has been shown to decrease opioid use in the PACU. Randomized control trial study done in France on the effect of early postoperative oral fluid intake in pediatric day case surgery encouraged that pediatric oral drinks before administration of opioids or pain medication due to a decreased incidence of postoperative vomiting and total opioid requirement [38].

7.5. Fast track surgery protocol

The use of fast track surgery protocols has profound application in day care surgery pain management. It starts from preoperative optimization of patient to postoperative patient discharge. In fast track surgeries, NPO status of the patient should be reduced to decrease the preoperative hydration and reduce incidence of postoperative pain [39].

Intraoperatively, the use of opioids should be reduced to minimize its side effects with the use of different anesthesia techniques including local anesthesia and TIVA with fewer side effects and postoperative pain intensity [2,32].

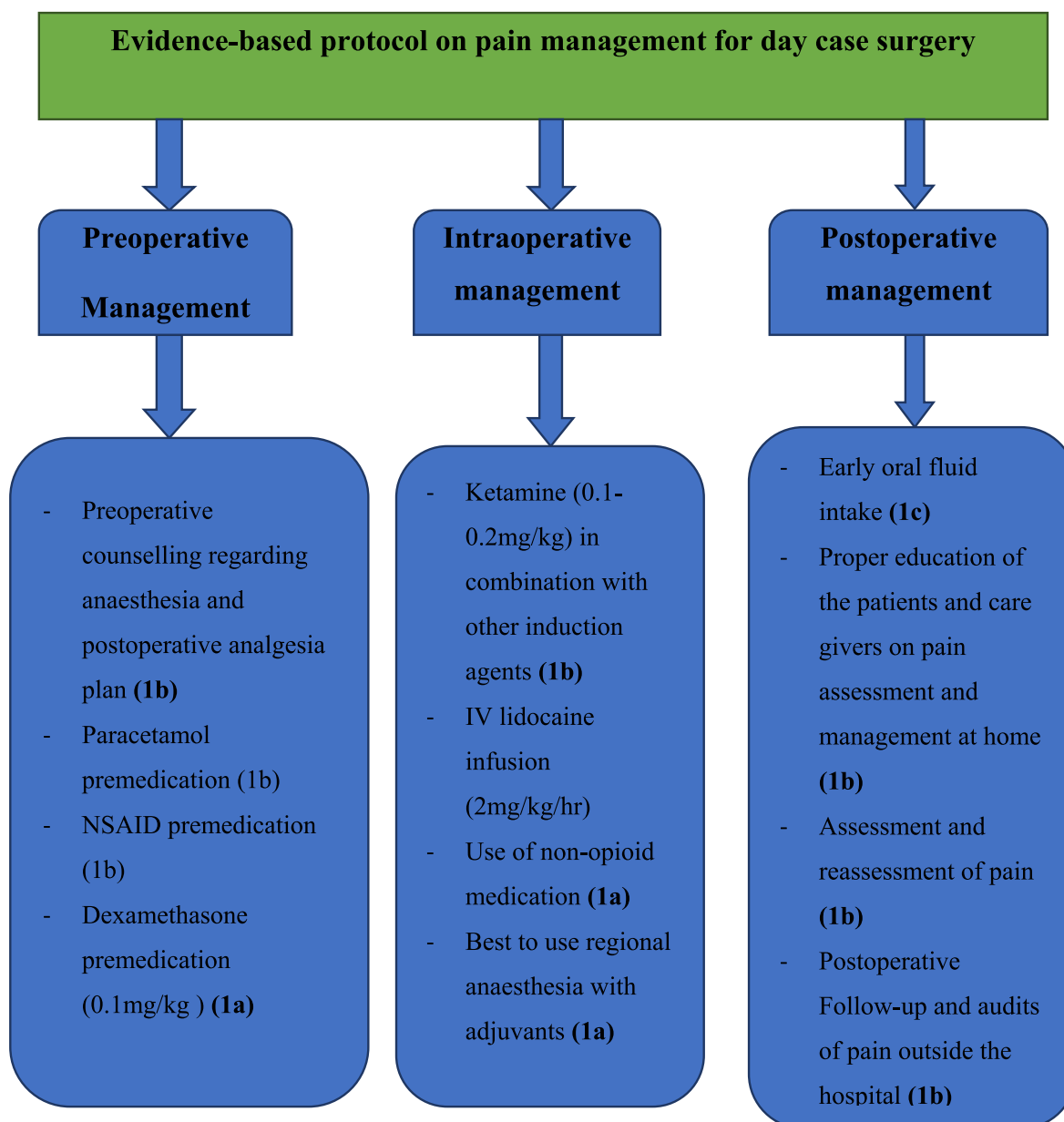


Fig. 2. Perioperative pain management protocol for day-case surgery.

7.6. Postoperative discharge and pain assessment

Most discharge criteria recommend that the level of pain should be acceptable to patient and be minimal enough to be controlled by oral medications. A review study recommended that the level of pain must always be assessed in the PACU to see the consistence of the expected pain score with the actual postoperative comfort and pain level of the patient [40]. This helps us to improve the quality of the day care service and stratify any risk of postoperative pain based on surgical procedure.

After discharge home, approximately one-third of day surgery patients continue to experience moderate-to-severe pain. The pain is often worse on the second postoperative day when patients start to mobilize. All patients should therefore be discharged home with an adequate supply of analgesia with clear instructions for regular administration and to alleviate breakthrough pain. Free pre-packaged take-home medications should be provided before discharge as they are convenient and prevent delays and unnecessary visits to the hospital pharmacy. Needless to say, provisions should consider discharge before weekends

and local holidays. For patient queries, a point of contact telephone number will help if questions arise after discharge [6,9].

Planning for postoperative analgesia must be done during the pre-operative visit, keeping in mind the age, psychological and ASA status of the patient, and the type of surgery. Appropriate assessment of pain is essential for providing optimal analgesia. This assessment will continue throughout the perioperative period with the use of age specific and patient specific assessment tool [14,39].

Rescue analgesia should be offered if the prescribed analgesic is not effective. It has been shown that the use of pre-packaged take-home analgesics specific to the type of surgery and breakthrough medication can lead to improved pain control, mobility, avoid sleep disturbances and allow to have the patient early discharge and smooth recovery time [5].

7.7. Counseling and education of care taker

It is important to provide patient centered, individually tailored,

Table 2

Acute pain management protocol for adult patients undergoing day-case surgery.

	Pain intensity	Discharge medication
A.	None	None
B.	Mild	Paracetamol 1 g qds
C.	Moderate	Paracetamol 1 g qds + Ibuprofen 600 mg qds
D.	Moderate(NSAID intolerant)	Paracetamol 500 mg/+ codeine 30 mg1–2 tabs qds
E.	Severe	Paracetamol 500 mg/codeine 30 mg 1–2 tabs qds + Ibuprofen 600 mg qds
F.	Severe(NSAID intolerant)	Paracetamol 1g qds + Oral morphine 20 mg qds

Source: WHO analgesic ladder and the AAGBI day case surgery

Table 3

Pain intensity of common day-case surgical procedures.

A	B	C	D
EUA ears	Cataract surgery	Anal surgery	ACL reconstruction
Cystoscopy	Grommets/T-tube removal/insertion	Apicectomy	Circumcision
Restorative dentistry	Prostate biopsy	Non-wisdom tooth extraction	Endometrial ablation
	Sebaceous cyst surgery		
	Sigmoidoscopy	Axillary clearance	Laparoscopy
	Skin lesion surgery	Breast lumps	Haemorrhoidectomy
	Urethral surgery	Arthroscopy	Hernia repair
		Vasectomy	Joint fusions/osteotomy
		Varicose vein surgery	Shoulder surgery
		Vaginal sling	Squint surgery
		MUA ± steroid injection	Testicular surgery
		Middle ear surgery	Tonsillectomy
		Hysteroscopy/D&C	Wisdom tooth extraction
		Cervical/vulval surgery	Dental clearance
		Carpal tunnel decompression	
		Dupuytren's contracture	

culturally and linguistically appropriate education to the patient on treatment option for management of postoperative pain. It includes: information on how pain is reported and will be assessed in post-operative period including use of pain assessment tool, individualized options for post-operative pain management for particular patient, realistic goals for pain control to improve expectations to feel some pain is normal and not a sign of a problem and can significantly reduce anxiety and improve management of expectations, and pregnant women should be informed about potential effects of treatment options on the fetus and newborn [9].

7.8. Follow up and audit

Day case surgery units should strive to regularly evaluate their measures of success through audit reviews and annual reports on day-case rates overall and for individual challenging procedures, Unplanned admission rates and reasons for these admissions, symptoms reported by patients at 24 h follow-up, rates of readmissions [6,9]. This could be done through regular 24 h telephone follow up in order to check the status of the patient as well as get the necessary information for postoperative symptoms and satisfaction which will be appreciated by the patient and their care givers [9].

8. Conclusion and recommendations

Day surgery encourages patients to mobilize soon after their surgery and empowers them to manage their own pain control. Thus, preoperative patient education and high-quality perioperative pain management including pain management after discharge are paramount. Analgesic techniques that do not increase the incidence of postoperative adverse outcomes, and are safe and cost-effective, facilitate early ambulation. The financial benefits of day surgery over inpatient surgery are now well established.

With increasing healthcare demands for more day-case procedures, multi-modal analgesic techniques in the perioperative period with good extension of analgesia into the postoperative discharge period are essential. Implementing evidence-based protocols for formal post-operative assessment, documentation, and management of pain following discharge and analgesia prescription for health care providers is highly recommended (Fig. 2, Tables 2 and 3).

9. Strength and limitation of the review

This review provides evidence-based working protocol on pain management for patients undergoing day case surgery in a resource limited setting. This protocol guides the physicians to provide appropriate pain relief interventions appropriately.

However, this review was conducted from different articles that are not homogenous in methods and study type. Moreover, this work emphasizes on the qualitative review of recommendations on pain management for day case surgical patients. Therefore, we recommend future researchers to conduct a meta-analysis of studies on pain management for day case surgery.

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Ethical approval

The study was approved by the Ethical Committee of institution.

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Author contribution

Abebe MM, Arefayne NR, Temesgen MM and Admass BA developed key questions and keywords, analyzed the results of the search, prepared and revised the manuscript. All authors approved the final manuscript for publication.

Registration of research studies

1. Name of the registry: researchregistry
2. Unique Identifying number or registration ID: researchregistry7948.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): <https://www.researchregistry.com/browse-the-registry#home/>

Guarantor

Melkam Mulugeta Abebe, Nurhusen Risky Arefayne, Mamaru

Mollalign Temesgen and Biruk Adie Admass are all responsible for this work.

Consent

Personal identifiers in the manuscript and during data collection processes were not included. So, consent for publication not applicable.

Declaration of competing interest

No conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104322>.

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