NEWSLETTER

Hong Kong Association of Critical Care Nurses Limited (HKACCN)

香港危重病學護士協會有限公司
Hong Kong Association of Critical Care Nurses Ltd.

Message from the President

Vol. 24, No. 1, Nov 2023

LEUNG Fung Yee
President
HKACCN

Dear Members of the Critical Care Nurses Association,

I hope this message finds you all in good health and high spirits as we continue to navigate the challenges of our profession. Global pandemic in the past three years has tested our resilience like never before. We have witnessed the devastating impact of COVID-19, and our intensive care units have been on the front line of this battle. Despite the difficulties, you have risen to the occasion, demonstrating extra-ordinary courage and compassion in the face of adversity. Your tireless efforts have saved countless lives, and I am immensely proud to lead an association comprised of such remarkable critical care nurses in Hong Kong.

Since the healthcare landscape continues to evolve rapidly, we must stay at the forefront of innovation and best practices to deliver the highest standard of care. As critical care nurses, we shoulder the responsibility of advocating for our patients and ensuring their well-being during their most vulnerable moments. Let us continue to embrace lifelong learning and professional development, empowering ourselves with the knowledge and necessary skills to meet the evolving needs of our patients.

Yet, collaboration and camaraderie are the core value of our association. Our collective strength lies in our ability to come together, share experiences, and support one another. I encourage you all to actively engage in the various educational and networking opportunities provided by our association. Together, we can foster an environment of growth and mutual support that elevates our profession to new heights.

This year, according to the constitution of our association, we have conducted an election for a new Board of Directors for the term 2023-2025. As we are going to embark on a new chapter, I would like to express my gratitude to the outgoing Board Members for their remarkable contributions and unwavering commitment during the past 2 years. Their selfless dedication to our Association during the difficult time of COVID-19 outbreak are instrumental in ensuring the success of our association.

Now, I would like to extend my warmest congratulations and a heartfelt welcome to the newly elected Board of Directors (please refer to the table). In this term, we are thrilled to have a large group of enthusiastic members with diverse backgrounds and experiences to join our new board for continuing development of our association. I am very honoured to serve as the President again, and I am humbled by the privilege of leading such an exceptional group of critical care nurses. Together, let us continue to champion the highest standard of care, advocate for our patients, and support each other on this remarkable journey.

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Evidence-based Practice: The Impact of Early Mobilization Program on Critically Ill Patients in Intensive Care Unit

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Intensive Care Unit
Tseung Kwan O Hospital

Introduction

In the challenging landscape of intensive care units (ICUs), optimizing patient recovery and outcomes remains a paramount goal. One of the most significant obstacles to patient recovery is ICU-acquired weakness (ICU-AW). It greatly affects a substantial number of critically ill patients (Alaparthi, Gatty, Samuel, & Amaravadi, 2020; Cameron et al., 2015; Hill, 2022; Wang et al., 2020). ICU-AW leads to muscle atrophy, decreased mobility , and various complications (Alaparthi et al., 2020; Wang et al., 2020). To prevent these issues, early mobilization program (EMP) has gained recognition to enhance patient muscle recovery. It reduces ICU-AW as well as the related complications (Alaparthi et al., 2020; Schallom et al., 2020; Wang et al., 2020). Despite the recognized benefits of EMP for critically ill patients, there is a lack of extensive studies and clear guidelines for its implementation (Nydahl et al., 2018). Challenges to implement EMP including low compliance and safety concerns among staff, which have hindered the widespread adoption of EMP in critical care settings (Cameron et al., 2015; deSouza et al., 2022). This summary reports the findings of a recent study that investigated the impact of EMP on critically ill patients in a local ICU.

Objectives

The objective of this study is to investigate the effects of EMP on ICU patient's mobility; and secondarily to enhance ICU nurse's competency to promote EMP.

Methods

The data were collected from an adult ICU in Tseung Kwan O Hospital over an 11-month period (July 1, 2022 to May 31, 2023) through convenience sampling. To ensure systematic implementation of EMP, our team developed a flow chart and instruction sheet to provide guidance to the nurses in ICU. Patient assessments were conducted twice daily by intensive care nurses commencing 24 hours after admission to ICU. The assessments included vital parameters by the scores of Richmond Agitation-Sedation Scale (RASS) and Glasgow Coma Scale (GCS), and muscle strength. These data were used to determine each patient's specific ICU mobility, referencing the provided EMP flow chart.

Under the EMP framework, participating nurses provided mobilization exercises, which were tailored to each patient's mobility scale. The spectrum of activities ranged from minimal intervention (passive exercises at the bedside) to more extensive effort of the patient (bedside marching — performing over four or more steps). Each EMP session was designed to last

for a minimum of 15 minutes, and each EMP session was documented in the designated data collection sheet.

Statistical Package for the Social Sciences (SPSS) was used for data analysis. The compliance rate and demographic information of participating patients were summarized using frequencies and percentages. Wilcoxon signed-rank test was used to assess the differences in muscle strength and mobility scores before (Pre-EMP) and after (Post-EMP) patients participated in the EMP, particularly upon their discharge from the ICU.

Results

A total of 114 participants were included for analysis after excluding 142 cases deemed ineligible due to their physical or psychological in-stability. These 114 patients are comprised of 68 males and 46 females from various specialties (62.3% medical, 28.1% surgical, and the rest in other fields). The compliance rate for implementing EMP exceeded expectations, reaching an impressive 82%. This noteworthy level of compliance suggests the feasibility of implementing EMP for ICU patients as perceived by healthcare professionals.

The study also unveiled significant enhancement in patient mobility ($p < .001$), specifically in terms of upper limb strength (pre-EMP mean: 3.63; post-EMP mean: 4.56), lower limb strength (pre-EMP mean: 3.38; post-EMP mean: 4.24), and mobility score (pre-EMP mean: 1.38; post-EMP mean: 3.31) following the implementation of EMP. The improvement in mobility suggests that EMP holds promise for enhancing the physical well-being and functional outcomes of ICU patients.

Limitations

Limitations of this study include a potential selection bias and the absence of a control group. To address these limitations and provide better understanding of the impact of EMP, it is suggested to have randomized controlled trials in diverse patient populations.

Conclusion

This study highlights the potential benefits

of EMPs in ICU settings, emphasizing its positive impact on muscle strength and mobility. With the encouraging results from this study, our team hopes to inspire further research and discussion on this issue, aiming at advancing ICU patient recovery and outcomes.

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Embracing the Challenges in Pain Management: Strategies for Optimal Patient Outcomes

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Pain is regarded as the fifth vital sign but is often overlooked (Morone & Weiner, 2013). In the Intensive Care Unit (ICU), effective pain management that includes pharmacological and non-pharmacological interventions could re-

duce the incidence and severity of delirium and promote patient recovery (Pisani et al., 2019). To empower ICU nurses in pain management and enhance the nursing care of patients with IV-Patient Controlled Analgesia (PCA), a PCA Fentanyl User Guide was developed and implemented in the ICU of Tuen Mun Hospital. A pilot program on non-pharmacological pain management was also launched.

The PCA Fentanyl User Guide: Empowering Junior Nurses

Patient Controlled Analgesia (PCA) has proven to be more effective at pain control than non-patient-controlled opioid injections and resulted in higher patient satisfaction (McNicol et al., 2015). The comprehensive PCA Fentanyl User Guide outlines standardized nursing roles, points for patient education with the '6Ws' framework (Fig. 1), and instructions for handling PCA machines during different phases of IV PCA management.

The user guide incorporates the mnemonic "OPIOID", which ensures that critical steps are not overlooked during PCA initiation, administration, observation, and termination (Fig. 2). By implementing this user guide, patient safety in the ICU is promoted, nurse competence enhanced, patient education empowered, and effective pain relief facilitated. Additional in-house training for junior nurses based on the Guide enhances its implementation and fosters a culture of standardized practice.

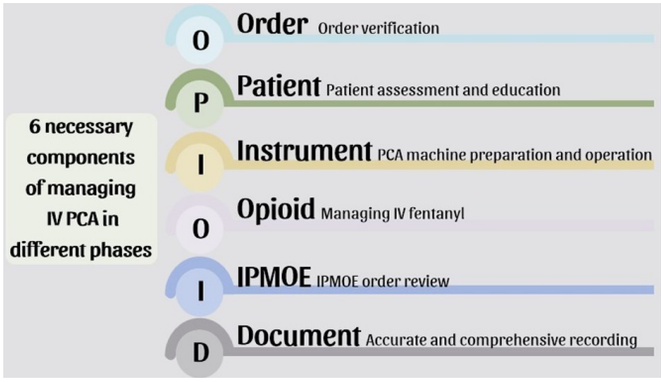

Fig. 2 The Mnemonic OPIOID

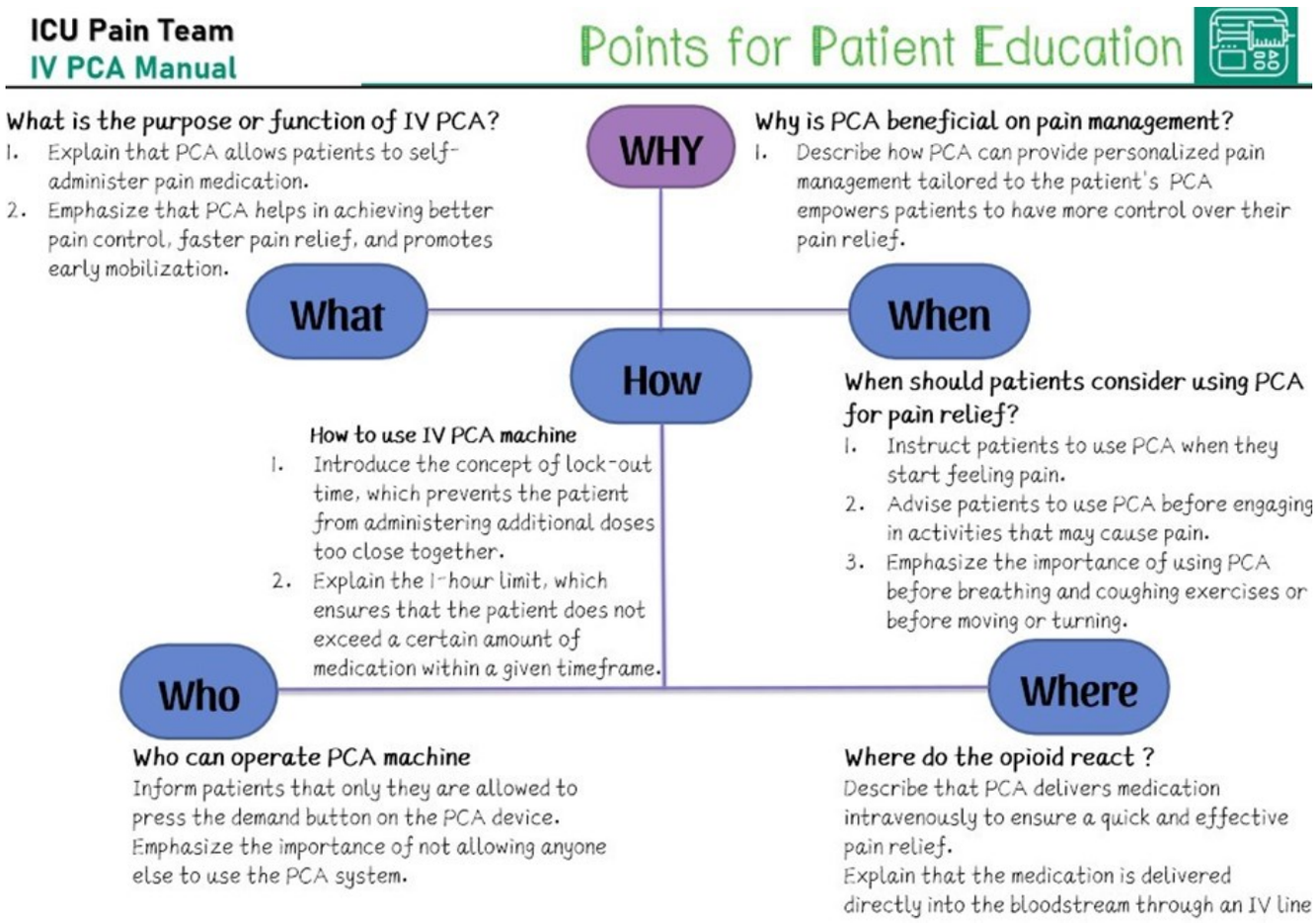

Fig. 1 Points for Patient Education with the '6Ws' Framework

A Successful Experience: Non-Pharmacological Pain Management Program

A successful 8-week pilot program focused on non-pharmacological pain management has also been implemented in the ICU for patients. This program introduces interventions such as aromatherapy, cold therapy, music listening, and deep breathing exercises, which can reduce significant pain among critical patients (Kia et al., 2021). Over 90% of the participants have reported the effectiveness of these interventions. Clear guidelines, education, and established workflows have been provided to ensure staff compliance. This holistic approach addresses the psychological and emotional aspects of pain, improving patient comfort and reducing reliance on opioids. The program's achievement establishes a foundation for integrating non-pharmacological interventions as standard practice in ICU pain management, optimizing patient care.

Conclusion

A comprehensive approach to pain management that effectively addresses the challenges faced in providing optimal care to patients has been implemented in the ICU of Tuen Mun Hospital. Implementing a PCA Fentanyl User Guide has empowered nurses to deliver standardized and competent pain management. The success of the Non-Pharmacological Pain Management Program highlights the efficacy of alternative interventions such as aroma-therapy, cold therapy, music listening, and deep breathing exercises. Creating a soothing ICU environment enhances patient comfort and improves overall healing. Tuen Mun Hospital is committed to optimizing pain management and improving patient outcomes within the ICU setting through these initiatives.

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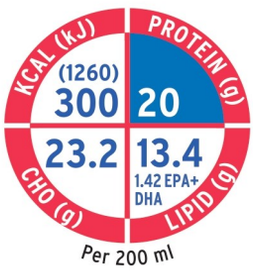

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Use of Anaesthetic Conservating Device for Refractory Status Epilepticus in ICU

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Background

The Neurocritical Care Society defines status epilepticus (SE) as a life-threatening neurologic condition, that lasts for 5 or more minutes of either continuous seizure activity or repetitive seizures without regaining consciousness (Brophy et al., 2012). It is a life-threatening condition causing different significant morbidity & mortality, including cerebral hypoxia, respiratory arrest, rhabdomyolysis and cardiac arrythmia.

Treatment for SE includes the use of benzodiazepines, intravenous anti-epileptic drugs and intravenous anaesthetic agents that suppress or terminate abnormal cerebral electrical activities. However, 20% of the patients will develop refractory SE, which is the New Onset Super-Refractory Status Epilepticus (NOSRSE), a term firstly used by Wilder-Smith et al. (2005). Patients with NOSRSE have persistent SE for more than 24 hours despite the use of intravenous anti-epileptic drugs, benzodiazepines, and anaesthetic agents. The mortality rate of these patients can be up to 30% in adults with significant long-term neurological sequelae, only around 27 - 50% of them could have a definite cause being identified, including autoimmune encephalitis, infections, neoplasm, and gene mutation (Stavropoulos, Khaw & Valentin, 2023).

Current ICU sedation practice predominantly relies on benzodiazepines, which are commonly combined with opioids to provide analgesia and co-sedation to control SE. Prolonged use of the benzodiazepines, anti-epileptic drugs, and intravenous anaesthetic agents in attempts to control NOSRSE causes withdrawal, liver intoxication, renal impairment, hemodynamic instability and prolonged weaning.

Introduction of Volatile Anaesthetic Agent in ICU

For patients with status epilepticus, status asthmaticus, and addiction withdrawal syndrome, the use of volatile anaesthetic agent (VAA) to replace intravenous anaesthetic agent increased dramatically in the US and Europe during the COVID-19 pandemic due to the inadequate supply of intravenous anaesthetic agents. For decades, VAA has been used for major surgery based on the delivery of volatile anaesthetics such as nitrous oxide, isoflurane, desflurane, or sevoflurane for inhalation to produce general anaesthesia. It is achieved by preventing pre-synaptic excitation, blocking post synaptic neurotransmitter, and enhancing GABA and glycine that promote relaxation and sleep (Fig. 1). The benefits of VAA include rapid onset, lower dose and easy to titrate. VAA can produce bronchodilation and anti-convulsion effects, as well as improving regional blood flow to the heart, liver, kidneys, and brain.

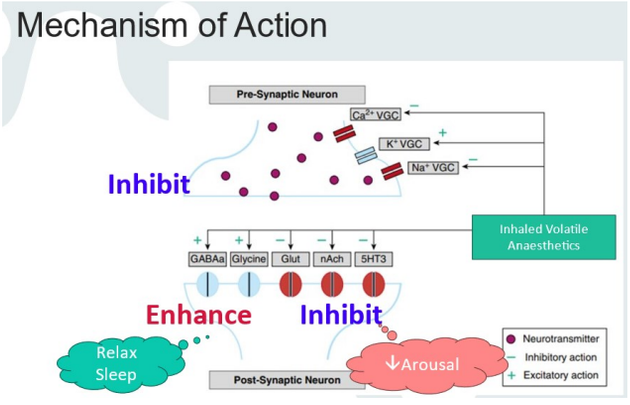

Fig. 1 Mechanism of the Action of Volatile Anaesthetic Agent (VAA) (modified from Jerath et al., 2016)

Although the benefits of VAA are obvious and superior to intravenous anaesthetics, it requires special cartilage and cassette of VAA to administer through vaporizers of the anaesthetic machine. The set of equipment is bulky, difficult to access, and unable to be connected to modern ICU ventilators; and not all staff are trained to use. This hinders the use of VAA in ICU.

Application of Anaesthetic Conserving Device in ICU

In recent years, the development of Anaesthetic Conserving Device (ACD) (Fig. 2) favours the

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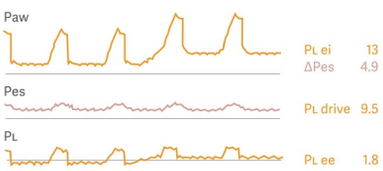
NIV NAVA significantly improves patient-ventilator interaction, and reduces NIV complications. For patients with acute exacerbation of COPD it can be effective in managing their status and to improve patient outcomes.



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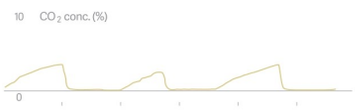

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application of VAA in ICU. The ACD contains an electrostatic bacterial and viral filter that replaces the heat and moisture exchange filter. The only available liquid VAA for ACD in Hong Kong at the moment is isoflurane. When liquid isoflurane is given via syringe pump into the ACD, it is saturated into the vaporizer for simultaneous inhalation to the patients through mechanical breaths. When exhaled, the active carbon filter will re-absorb 90% of isoflurane. The remaining 10% will be exhaled via ventilator expiratory cassette to a scavenger system and transported out into the environment.

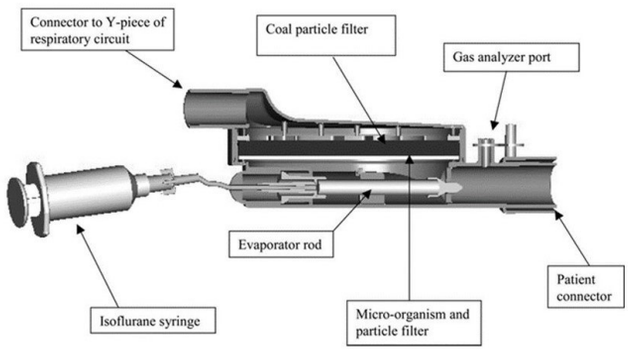

Fig. 2 Cross-sectional View of the Anaesthetic Conserving Device (ACD, AnaConDa) (Source: Sackey et al., 2004)

To maintain occupational safety and correct titration of the isoflurane, a gas analyzer is connected to the inspiratory port of the ACD to indicate the Minute Alveolar Concentration (MAC) for titration, and to the expiratory cassette of the ventilator to indicate the Expiratory Concentration of isoflurane (EtISO) (Fig. 3). The target of MAC is ~1 and the EtISO is 0.2-0.6. The usual rate of isoflurane infusion to maintain the target of MAC ~1 is 2-7ml/hr. The VAA is directly metabolized in the lung which provides room for liver and kidneys to recover from high dose of IV anti-epileptic drugs and sedation.

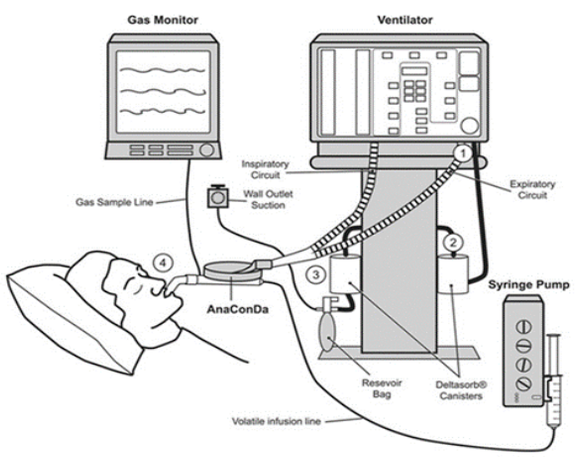

Fig. 3 Set-up of the Anaesthetic Conserving Device with ICU Ventilator (Source: Pickworth et al., 2013)

Example of a Case Profile

Our patient who received the first ACD was a 48-year-old male, admitted to ICU due to acute confusion with status epilepticus. Despite aggressive anti-epileptic treatment, including high dose IV sedation, muscle relaxation, thiopentone infusion, IV and oral anti-epileptic drugs, pulse steroid, and seven sessions of plasma exchange, patient remained in epileptic status as shown by EEG, with cerebral swelling shown in MRI after two weeks of treatment. His liver and renal functions deteriorated. No obvious positive microbiology was noted in any screening and lumbar puncture. Autoimmune and neoplastic markers are negative. Blood for genetic mutation (mitochondrial defects) was sent for analysis. The patient was diagnosed with NOSRSE. The case had been discussed in the ICU network among doctors and an anaesthetist was consulted who suggested ACD application on Day 14.

With the application of ACD, limbs twitching of the patient was suspended within a minute, and EEG showed burst suppression within 5 minutes of isoflurane inhalation. The MAC and EtISO was 0.3 and 0.35 respectively with isoflurane given at 4ml/hr. The thiopentone infusion was withheld after 8 hours. Other IV sedation and muscle relaxant were commenced for weaning the next day. The ACD was started on D14 of ICU admission and weaned on D26. All IV sedation had been successfully weaned on D43 and patient (with a tracheostomy and GCS E4VTM2) was discharged from ICU without seizure on D46 to a neurology unit. Unfortunately, the patient developed cardiac arrest four days after ICU discharge in the neurology unit and died. Private lab results of T-tau protein and protein 14-3-3 were high, which suggested prion disease/ transmissible spongiform encephalopathies (Creutzfeldt-Jakob Disease (CJD) / mad cow disease). A post-mortem brain biopsy was required to confirm the diagnosis.

Nursing Care of Patients using Isoflurane Inhalation with ACD

The goals of nursing care are to, 1) maintain optimal oxygenation and prevent overdose of anaesthetic agent, 2) prevent complications related to isoflurane, and 3) prevent leakage of VAA for occupational safety.

1) *Maintain optimal oxygenation and prevent overdose of anaesthetic agent*

Assuring adequate minute ventilation can guarantee adequate oxygenation as well as efficient isoflurane delivery. With the mon-

itoring of MAC, EtISO, SpO_2, inO_2 and ABG (Fig. 4), as well as the titration protocol (Fig. 5), optimal isoflurane dosage is monitored and administered.

Fig. 4 EtISO, MAC and inO2 Values from Gas Analyzer as shown in a Patient Monitoring System

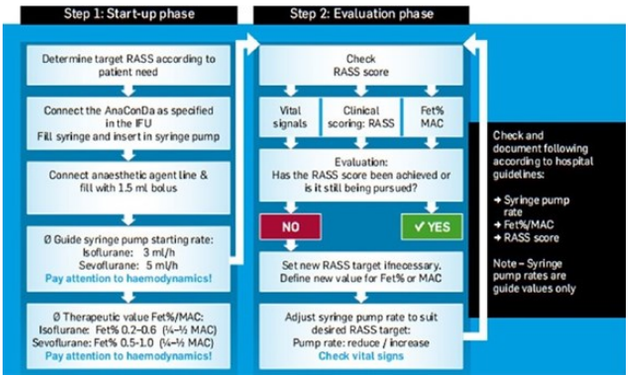

Fig. 5 Volatile Anesthetic Agent Titration Chart (Source: Sedana Medical, 2018)

2) *Prevent complications related to isoflurane*
Isoflurane may induce malignant hyperthermia with signs of increasing end tidal CO_2, muscle rigidity and high fever >40°C. Regular monitoring of core temperature, $ETCO_2$, serum calcium level as well as ABG can early detect the development of malignant hyperthermia. Isoflurane also promotes dose-dependent cerebral vasodilation. Therefore, patients with suspected increased intra-cranial pressure should be managed accordingly.

Although isoflurane has a low hemodynamic effect, when it is used in the beginning, due to its rapid action and metabolism, together with the residual effect of IV sedation, patients may develop hypotension. This can be corrected by administering fluid bolus. Once the isoflurane has begun, the IV sedation will need to wean down cautiously per protocol. On the other hand, isoflurane is less hepatotoxic, and it may reduce renal blood flow. Daily monitoring of liver and renal functions, as well as urine output and signs of jaundice, is needed.

3) *Prevent leakage of VAA for occupational safety*
Isoflurane is easily vaporized under room temperature. There is a risk of isoflurane leakage during the withdrawing of isoflurane into syringe, or connecting and disconnecting the ACD system with the ventilator circuit and gas analyzer. When withdrawing isoflurane from the supply, one-way valve and special ACD syringe are used to prevent leakage (Fig. 6). A tight connection between the ACD and ventilator circuit is always ensured. When there is a need to disconnect the ACD or ventilator accessories, it is necessary to stop or cap off the isoflurane infusion first. The use of Nafion dryer tubing to connect the ACD to the gas analyzer can evaporate water condensate, and minimize the need to disconnect the gas analyzer for drainage of condensation. Disposal of the unused isoflurane bottle and syringe with the one-way valve and cap can also prevent isoflurane leakage.

Fig. 6 Safety Features of the ACD Syringe (One-way Valves) and Nafion Dryer Tubing (Source: Sedana Medical, 2018)

Conclusion

Volatile anaesthetic agent is efficient in controlling seizures, especially for patients with refractory status epilepticus. The set-up is fast and easy but occupational safety should be ensured. The titration and monitoring are not difficult, protocol and objective data are easy to follow. Different volatile anaesthetic agents have unique end-organ protection effects, all potential complications should be monitored. The use of volatile anaesthetic agents might also be extended to patients in ICU with status asthmaticus and withdrawal syndrome in the near future.

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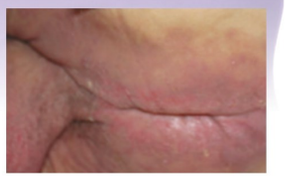

Patient with improvement noted on Day 4

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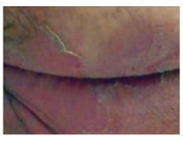

Incontinence-Associated Dermatitis (IAD)

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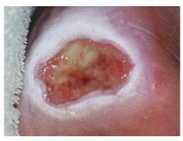

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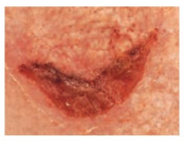

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[2] 3M data on file. EM-05-01 3924.

從「我不懂」到「我會學」

凍檸茶

一轉眼, 成為護士將近四年。實習時, 前輩們都說過許多護理工作的辛酸, 因此, 我早已對這份工作的壓力抱有心理準備。當時寫了一封「給無力且迷茫的你」的信給自己, 好讓自己在工作覺得疲倦無力的時候, 提醒自己成為護士的初衷, 有力量繼續走下去。至今這封信依然保存在書桌抽屜櫃內。

記得入職前, 我們一班小薯前往中央護理部, 被詢問我們有興趣工作的部門。當時我選擇了深切治療部, 然而深切治療部需要有經驗的護士, 那我只好選擇內科, 希望打好護理基礎, 盼望日後若能轉到深切治療部, 可以幫上一點忙。

兩年後, 有幸由內科轉到深切治療部, 當中體會到兩者最大的分別就是對於病人的照顧。在內科繁重的工作量下, 很多護理工作未必能夠全面兼顧。然而, 在深切治療部, 提供的卻是全人護理。曾經有個病人的女兒前來告訴我, 十分感謝我們為母親洗頭, 一問之下, 原來礙於家居環境和病人身體狀況, 他們在家中無法為母親洗頭。 對我來說, 看到當時女兒撫摸著母親的長髮說：「阿媽, 你終於有得洗頭」的這一幕, 歷歷在目 。深切治療部除了提供重症治療服務, 我們都不會忽視如剪指甲、刮鬍子、抹身、口部腔護理等基本照顧。除了因為這些基本照顧可為病人減低感染風險外, 也令他們保持尊嚴。這些我們看似簡單的基本護理, 對於無法自行完成的病患者來說卻是十分珍貴。

另外, 相比起內科, 在深切治療部, 需要我們與病人及其家屬有更多的溝通。疫情期間, 醫院禁止一般探訪, 我們護士每日都會致電家屬講述病人最新情況。記得有一位婆婆, 因新冠肺炎入院, 需接受高濃度氧氣治療。在照顧婆婆期間, 眼見她憂心忡忡, 雖然自己仍有大量工作要做, 仍是覺得需要了解一下, 一問之下, 原來婆婆擔心同樣染疫, 卻在家中獨自隔離的丈夫。安撫婆婆後, 便隨即聯絡她的丈夫和子女, 為他們安排多人視像通話。婆婆通話後, 彷彿放下心頭大石, 面露微笑感謝我們的安排。數天後, 婆婆病情惡化, 需要插喉和洗血等治療, 及後因為多個器官衰竭, 家人決定不施行心肺復甦術。婆婆的女兒在恩恤探訪時, 哭紅着眼握着我的手多謝我們為他們安排視像通話, 令在家中隔離的他們能夠與當時仍然清醒的婆婆見面通話, 原來那一次通話, 是他們最後一次聽到婆婆的聲音。假如當時只專注醫療護理程序, 沒多問一句, 了解到婆婆的擔憂, 或許會令他們都留有遺憾。

轉到深切治療部的時間, 正正是新冠肺炎疫情第四波, 當時不少患者情況嚴重, 大大增加了深切治療部床位的需求, 醫護染疫導致人手短缺, 同時令工作量大增。在這個嚴峻的環境, 對剛加入深切治療部工作的我來說, 卻令我更加了解到自己的不足, 當時透過學習、觀察和提問, 盡快適應這個既困難又充滿挑戰的新環境。這裏充滿了各種學習的機會, 有些病人被診斷出的疾病, 我從未聽聞; 有些只會在深切治療部提供的治療方法, 我第一次嘗試。 直至現在, 仍有許多需要學習的地方, 縱然很不容易, 但時刻提醒自己迎難而上, 與其只是說「我不懂」, 我更希望能夠保持著「我會學」的心態。 在未來護士生涯路上, 即使沿路崎嶇, 途中可能會感到迷茫、 沮喪, 屈時, 拿出那封給自己的信, 細閱一下, 給自己一點力量繼續前行。 不斷學習, 勿忘初衷, 堅守護士的責任, 這是我對自己的承諾。


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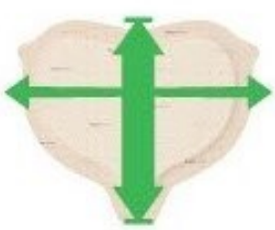

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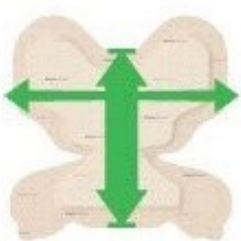

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