Review Paper

A survey of critical care nurses' knowledge of intra-abdominal hypertension and abdominal compartment syndrome

Leanne Hunt RN, MHM [a],*,
Steven A. Frost RN, PhD [b],
Phillip J. Newton RN, PhD [c],
Yenna Salamonson RN, PhD [d],
Patricia M. Davidson RN, PhD [e]

[a] Western Sydney University, School of Nursing and Midwifery, Liverpool Hospital, University of Technology Sydney, Locked Bag 1797, Penrith, NSW 2751, Australia
[b] Western Sydney University, School of Nursing and Midwifery, Liverpool Hospital, Locked Bag 1797, Penrith, NSW 2751, Australia
[c] University of Technology Sydney, Centre for Cardiovascular and Chronic Care, Faculty of Health, PO Box 123, Broadway, NSW 2007, Australia
[d] Western Sydney University, School of Nursing and Midwifery, Centre for Applied Nursing Research (CANR), Ingham Institute for Applied Medical Research, Locked Bag 1797, Penrith, NSW 2751, Australia
[e] Johns Hopkins University, School of Nursing, Centre for Cardiovascular and Chronic Care, Faculty of Health PO Box 123, Broadway, NSW 2007, Australia

ARTICLE INFORMATION

ABSTRACT

Background: Intra-abdominal hypertension and abdominal compartment syndrome are potentially life threatening conditions. Critical care nurses need to understand the factors that predispose patients to intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS). Predicting and managing IAH and ACS are important to improve health outcomes.

Aim: The aim of this paper was to (1) assess the knowledge of Australian critical care nurses about current IAH and ACS practice guidelines, measurement techniques, predictors for the development of IAH and ACS and (2) identify barriers in recognizing IAH, ACS and measuring IAP.

Methods: Between October 2014 and April 2015 86 registered nurses employed in the area of critical care were recruited via the form to participate in an on-line, 19-item questionnaire. The survey was distributed to critical care nurses via the Australian College of Critical Care Nurses (ACCCN) mailing list and directly to intensive care units via The majority of participants were women (*n* = 62) all participants were registered nurses employed in critical care the response rate was 3.2%. The study design was used to establish demographic data, employment data, and individuals' knowledge related to IAH and ACS. Participants had the option to write hand written responses in addition to selecting a closed question response.

Results: The results showed that most survey participants were able to identify some obvious causes of IAH. However, less than 20% were able to recognize less apparent indices of risk. A lack of education related to IAP monitoring was identified by nearly half (44.2%) of respondents as the primary barrier to monitoring IAP.

Conclusion: Critical care clinicians' knowledge of IAH and ACS is generally low in the areas of presentation and outcomes of IAH and ACS requiring tailored and targeted educational interventions.

© 2016 Australian College of Critical Care Nurses Ltd. Published by Elsevier Ltd. All rights reserved.

1. Introduction

Intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS) are not new conditions affecting critical care patients. Indeed, as early as the 19th century, IAH was identified and ACS was described, although these were not named until more recent times.[1–3] The measurement of intra abdominal

* Corresponding author.
  E-mail addresses:
l.hunt@westernsydney.edu.au (L. Hunt), s.frost@westernsydney.edu.au (S.A. Frost),
phillip.newton@uts.edu.au (P.J. Newton), y.salamonson@westernsydney.edu.au
(Y. Salamonson), pdavidson@jhu.edu (P.M. Davidson).

pressure (IAP) and management of IAH and ACS have become accepted practice within critical care over the past 20 years.[4–8]

Both IAH and ACS are potentially life-threatening conditions. Therefore, it is necessary for critical care nurses to understand the factors that predispose patients to IAH and ACS, and to be vigilant when assessing patients to predict and manage patients appropriately.[9,10] The critical care nurse can play an important role in the early detection of patients at risk of IAH or ACS.

The modern intensive care unit has developed significantly to enable the improved detection and diagnosis of IAH and ACS. Critical care nurses' knowledge about IAH and ACS needs to be underpinned with a comprehensive understanding of pathophysiology and related knowledge of evidence based clinical practice guidelines.[5,10–12] Without this fundamental knowledge and understanding, presenting symptoms can be overlooked or misinterpreted as signs of other critical illness.[13]

Intra-abdominal pressure is the steady state of pressure concealed within the abdominal cavity. A range of 5–7 mmHg is considered a normal pressure in critical care patients.[11] Intra-abdominal hypertension is considered to be a sustained or repeated pressure of >12 mmHg. Intra-abdominal hypertension is graded into four categories; Grade I: IAP 12–15 mmHg, Grade II: IAP 16–20 mmHg, Grade III: IAP 21–25 mmHg, and Grade IV: IAP > 25 mmHg. Abdominal compartment syndrome is considered to be a sustained IAP > 20 mmHg, regardless of abdominal perfusion pressure, with a new organ dysfunction or failure.[11,14]

Elevated IAP is reported to be an independent predictor of patient outcomes including mortality and co-morbidities.[15] The incidence of IAH is reported to be between 30 and 60% of critical care patients and is associated with a wide range of patient presentations and medical interventions.[16–21] Factors such as abdominal surgery, trauma, massive fluid resuscitation (>3.5 L/24 h), ileus, hypothermia, acidosis, anaemia, oliguria, high lactate and failure of the respiratory, renal or, liver function are considered to contribute to the development of IAH and ACS.[14,17,18,22–24]

In contrast, the incidence of ACS is low, ranging from 0.9% to 12% among critical care patients, however, it is considered to be an independent predictor of mortality due to the significant impacts on end organ function.[18,23,25–27] Despite the relatively low incidence of ACS, mortality rates from ACS have been reported to be between 50% and 80%.[18,23,26]

Due to changes in treatment paradigms for patients sustaining traumatic injury and those with critical care illness, promoting the awareness of IAH and ACS and the development of clinical practice guidelines by the World Society of Abdominal Compartment Syndrome (WSACS) has likely contributed to the decline in the development of ACS.[11,28,29] Despite this decline it remains necessary for critical care nurses to regularly monitor IAP and organ perfusion to indicate potential adverse outcomes and be proactive in the IAH and ACS management of critical care patients.[10]

1.1. Aim

The aim of this paper was to (1) assess the knowledge of Australian critical care nurses about current IAH and ACS practice guidelines, measurement techniques, predictors for the development of IAH and ACS and (2) identify barriers in recognizing IAH, ACS and measuring IAP.

2. Methods

Between October 2014 and April 2015 eighty-two registered nurses employed in the area of critical care were recruited via the SurveyMonkey® platform to participate in an on-line questionnaire. The study design was used to establish demographic data, employment data, and individuals' knowledge related to IAH and ACS. Items for the questionnaire were generated by reviewing existing guidelines and current research. The survey was piloted in 2013 to identify ambiguities and redundant items. Participants had the option to write hand written responses in addition to selecting a closed question response. Participants who were not registered nurses or not employed in critical care were excluded from the study.

The survey was distributed to critical care nurses via the Australian College of Critical Care Nurses (ACCCN) mailing list and directly to intensive care units via The ACCCN has approximately 2000 members, surveys were sent to 5 intensive care units. Consent was a requirement to participate in the survey. This survey has institutional ethics approval HREC 2013000751.

2.1. Statistical analysis

Survey data were collected using the SurveyMonkey® platform and exported into SPSS database Version 22 for Windows® for statistical analysis.[30] Descriptive statistics was used to summarize the characteristics of online participants. Continuous variables were summarized using means and standard deviations, categorical variables were summarized using frequencies and percentages.

Table 1
Characteristics of participants (n = 86).

Variable	
Sex, n (%)	
Male	20 (24.4)
Female	62 (75.6)
Age group (years), n (%)	
20–24	4 (4.7)
25–29	9 (10.6)
30–34	10 (11.8)
35–39	10 (11.8)
40–44	17 (19.8)
45–49	13 (15.1)
50–54	15 (17.6)
≥55	7 (8.2)
Place of employment, n (%)	
Private	6 (7.2)
Public	77 (92.8)
Years employed in critical care setting, n (%)	
Up to 10 years	31 (36.5)
10 years or more	54 (63.5)
Primary role in critical care setting, n (%)	
Clinical work	31 (36.5)
Other than clinical work (e.g. education, research)	54 (63.5)
Nursing designation, n (%)	
Registered nurse	46 (54.8)
Clinical nurse specialist	17 (20.2)
Other (e.g. CNC, CNE)[a]	21 (25.0)
Postgraduate qualification in critical care, n (%)	
No	19 (22.4)
Yes	66 (77.6)
Clinical practice setting, n (%)	
Adult intensive care	65 (76.5)
Other (e.g. ED, CCU, HDU)	20 (23.5)
Monitor IAH and ACS in the current clinical workplace, n (%)	
No	19 (22.4)
Yes	66 (77.6)
Policy for IAH monitoring and ACS management at the current clinical workplace, n (%)	
No	19 (22.4)
Yes	66 (77.6)

[a] CNC, clinical nurse consultant; CNE, clinical nurse educator; ED, emergency department; CCU, coronary care unit; HDU, high dependency unit.