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Biometrics & Biostatistics International Journal

Review Article

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Impact of PAD guideline on masih daneshvari hospital ICU

Abstract

Background: The Pain, Agitation, Delirium (PAD) guideline has been reviewed and compiled by the American Chest Physicians College and American Respiratory Medicine Association. This guideline was translated in to Persian by residents of the Intensive Care Unit (ICU) to implement that at Masih Daneshvari hospital.

Aim: The study attempts to investigate the effects of the implementation of this guideline on ICU and its impact on patients.

Materials and Methods: This study was done as a case-control study. The variables related to admission in the hospital and ICU and also the awakening and ventilator characteristics of patients, were compared between two groups before and after guideline implementation. 100 patients before the implementation of the guideline and 120 patients after the implementation of the guideline were included and the variables were evaluated and compared in these patients.

Results: The mean ages of patients in the pre-group and post-group were 53.7±14.9 and 55.7±16.9 years, respectively (P=0.894). 70.0% of the participants in the pre-group and 69.2% in post-group, were men (P=0.930). The median Acute Physiology and Chronic Health Evaluation (APACHE) score was 24.8 in the pre-group and 20.4 post-group (P=0.863). The average days spent in the ICU for the pre-group was 8.2 days, and for pre-group were 5.7 days (P=0.043). The average length of stay in hospital was 20.3 days for the pre-group and 14.8 days for the post-group. 16% of the patients in the pre-group were treated with tracheostomy, while after PAD implementation in post-group, this rate was reduced to 8.3% (P=0.302). 16% of the patients in the pre-group had awake days while receiving a sedative infusion, while that rate in post group was 80% (P=0.012). 72 (72.0%) patients in the pre-group were continuous infusion (CI) sedative while 55(45.8%) patients in post-group were CI sedative (P=0.043). 52 patients in the pre- group were Spontaneous Awakening Trial (SAT) sedative, 20 days without ventilator, and 75 patients in the post-group had similar conditions, which experienced 21 days without ventilator (P=0.037).

Conclusions: The implementation of the protocol has led to improved hospitalization, ICU, awakening and ventilator indicators.

Keywords: pad guideline, intensive care unit, ICU, complications

Volume 8 Issue 4 - 2019

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Received: April 20, 2019 | **Published:** July 12, 2019

Abbreviations: PAD, pain & agitation & delirium; ICU, intensive care unit; APACHE, acute physiology and chronic health evaluation; CI, continuous infusion; SAT, spontaneous awakening trial; SBT, spontaneous breathing trial; IQR, interquartile range; SD, standard deviation; RASS, richmond agitation-sedation scale

Background

The Pain, Agitation, Delirium (PAD) guideline has been reviewed and compiled by the American Chest Physicians College and American Respiratory Medicine Association. This guideline provides a multidisciplinary and interdisciplinary approach to solving problems related patient PAD. The management of patients will facilitate by using this guideline through a chain of services in accordance with Treat, Assess and Prevent in relation to each Pain, Agitation and Delirium problem.[1–3]

Forums providing this guideline believe that the implementation of this guideline could reduce the time to start moving of patients, the time spent at the hospital and the ICU, and consequently increase the beds available to the hospital and the ICU. It will also increase the patient cognitive activity in the long-term and increase the number of discharged patients to home and even preserve the lives of patients and increase their survival.[4–6] In a multidisciplinary approach, the PAD considers a therapeutic team for patient that includes the patient, the patient's family, the hospital administrators, the physical therapy champion, the pharmacy champion, RT Champion, Rn Champion, and MD Champion. Accordingly, the guideline has been developed to improve the health of patients.[7–8]

As yet, limited studies have investigated the effects of guideline implementation on patients. However, a study was conducted at Ohio University by Balas and et al that mentioned many positive effects for the implementation of the manual, which includes important positive outcomes for patient. Balas study was a before-after research that showed guideline using, leads to better results in awakening in post group. Also early mobility indicators, 28-days mortality, ICU mortality and the respiratory outcomes of the patients, such as Spontaneous Breathing Trial (SBT) in post group significantly improved rather than pre group.[1,2,9–11]

This guideline was translated in to Persian by the ICU residents

in order to implement at Masih Daneshvari Hospital ICU. This case-control study attempts to investigate the effects of the implementation of this guideline on the intensive care unit and its impact on patients.

Material and methods

This case-control study was done to investigate PAD implementation effects on ICU patients. The variables related to admission in the hospital and ICU and also the awakening and ventilator characteristics of patients, were compared before and after guideline implementation. 100 patients were included in the study before PAD implementation and 120 patients included after PAD implementation. All patients older than 19 years who were admitted in surgical and medical ICUs were screened for eligibility. The variables such as number of hospitalized days in hospital and ICU, awakening indicators and some characteristics related to days without ventilator, were evaluated and compared in these patients, pre and post implementation groups. The patients, who were unable to obtain informed consent after 48 hours of ICU admission, were excluded from this study. Investigations and evaluations related to the project were conducted by trained researchers that did not play a role in prescribing and treating patients. Patients' APACHE score was assessed within the first 24 hours of admission to the ICU.

Statistics

The data were analyzed using the statistical package IBM SPSS version 22.0 and descriptive statistics (Statistical Package for the Social Sciences, Chicago, IL). The categorical variables are expressed as proportions and frequencies. The continuous variables are summarized as mean±SD or interquartile range (IQR). The data scatter is quantified using standard deviation (SD). To explore the independent nature of some variables, chi-square and *t* tests were used for independent samples, categorical, and continuous variables, respectively. *P* values less than 0.05 were considered significant.

Results

In total, 100 patients before (case or pre-group) and 120 patients (case or post-group) after PAD implementation were enrolled. The mean ages of patients in the pre-group and post-group were 53.7±14.9 and 55.7±16.9 years, respectively (P=0.894). 70.0% of the participants in the pre-group and 69.2% in post-group, were men (P=0.930).

The median APACHE score was 24.8 in the pre-group and 20.4 post-group (P=0.863). The median RASS score in this study was -2 in the pre-group and -1 the pre-group (P=0.045). The average days spent in the ICU for the pre-group was 8.2 days, and for pre-group were 5.7 days (P=0.043). The average length of stay in hospital was 20.3 days for the pre-group and 14.8 days for the post-group. 16% of the patients in the pre-group were treated with tracheostomy, while after PAD implementation in post-group, this rate was reduced to 8.3% (P=0.302). 16% of the patients in the pre-group had awake days while receiving a sedative infusion, while that rate in post group was 80% (P=0.012) Table 1.

72 patients in the pre-group were CI sedative, 19 days without ventilator, and 55 patients in post-group were CI sedative, which had 25 days without ventilator (P=0.043). 52 patients in the pre- group were SAT sedative, 20 days without ventilator, and 75 patients in the post-group had similar conditions, which experienced 21 days without ventilator (P=0.037). These findings were statistically significant (Table 2, Graphs 1&2).

Table 1 The demographic variables in the population under study in Masih Daneshvari Hospital

Variable	Pre-implementation	Post-implementation	p-value
	n=100	n=120	
Age, mean(SD), year	53.7±14.9	55.7±16.9	0.894
Male, n(%)	70(70.0%)	83(69.2%)	0.93
APACHE II score, median [IQR]	24.8[17-29]	20.4[15-25]	0.863
RASS score first ICU day, median, [IQR]	-2[-3-0]	-1[-3-0]	0.045*
ICU stay, mean (SD), day	8.2±5.9	5.7±4.9	0.043*
Hospital stay, mean (SD),day	20.3±20.9	14.8±15.9	0.037*
Tracheostomy	16(16%)	10(8.3%)	0.302
Awake days while receiving a sedative infusion	16(16%)	96(80%)	<0.001*

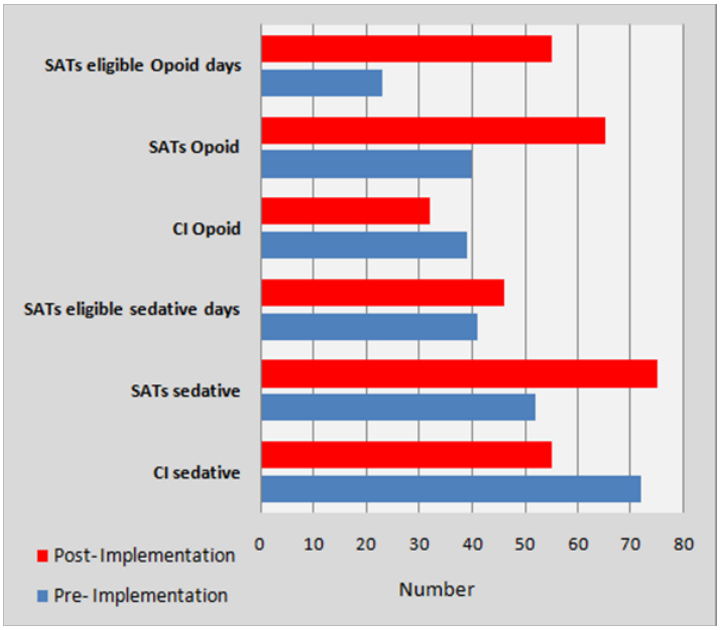
*Significant in 0.05 level, Richmond Agitation-Sedation Scale (RASS)

Table 2 Results of Awakening and ventilator in two groups

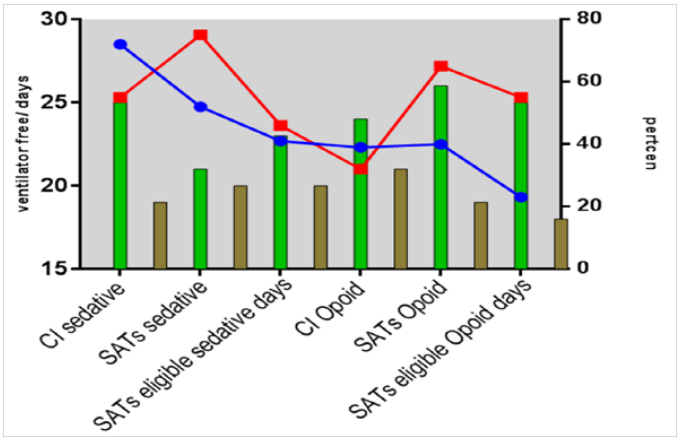
Awakening results	Pre-Implementation	Post-Implementation	P-value	Ventilator free day/pre	Ventilator free day/post	P-value
CI sedative	72(72.0%)	55(45.8%)	0.043*	19	25	0.307
SATs sedative	52(52.0%)	75(62.5%)	0.037*	20	21	0.857
SATs eligible sedative days	41(41.0%)	46(38.3%)	0.228	20	23	0.603
CI Opoid	39(39.0%)	32(26.7%)	0.122	21	24	0.61
SATs Opoid	40(40.0%)	65(54.2%)	<0.010*	19	26	0.203
SATs eligible Opoid days	23(23.0%)	55(45.8%)	<0.001*	18	25	0.23

*Significant in 0.05 level.

Citation: Khoundabi B, Ansar AF, Hashemian SM. Impact of PAD guideline on masih daneshvari hospital ICU. *Biom Biostat Int J.* 2019;8(4):145–149. DOI: 10.15406/bbij.2019.08.00283



Graph 1 Awakening results in Pre and Post groups.



Graph 2 Days without ventilator in two groups.

The patient number with SATs eligible sedative days in the pre-group was 41 patients, and the days without ventilator in this group were 20 days, while those values for the post-group were 46 and 23 respectively (P=0.228). CI opoid was 39 in the pre-group and 32 in the post-group, with days without ventilator for pre and post in 21 and 24 (P=0.122). It was not seen significant difference in SATs eligible sedative days and CI opoid between two groups (Table 2, Graphs 1&2).

In opiate SATs, 40 patients were in the pre-group and 65 patients in the post-group, with the days without ventilator in 19 and 26 amounts for two groups respectively. SAT eligible opoid days were 23 in pre and 55 patients in post, which patients had 18 days without ventilator in pre-group and 25 days in post-group. These differences were statistically significant (P=0.010 and P<0.001).

Discussion

The Pain, Agitation, Delirium (PAD) guideline has been reviewed and compiled by the American Chest Physicians College and American Respiratory Medicine Association.[1–3] As yet, limited studies have investigated the effects of guideline implementation on patients. However, a study was conducted at Ohio University by Balas and et al that mentioned many positive effects for the implementation of the manual, which includes important positive outcomes for patient.[1,9–11]

This guideline was translated in to Persian by the ICU residents in order to implement at Masih Daneshvari Hospital ICU. This case-control study with 100 patients in control group, duration before PAD implementation, and 120 patients in case control, duration after PAD implementation, attempted to investigate the effects of the implementation of this guideline on the intensive care unit and its impact on patients. Based on our findings, the implementation of this protocol in Masih Daneshvari Hospital ICU led to improvements in care indicators for patients admitted to this section. According to the estimates, the average length of stay in ICU fell from 8.2 days to 5.7 days, and the total number of days hospitalized in decreased from 20.3 days to 14.8 days, significantly. Patients' need for tracheostomy was reduced by more than half, from 16% to 8% and also it was seen an

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improvements as receiving anesthetic, so that the number of waking days increased from 16% to 80% when receiving anesthetic.

Forums providing this guideline believe that the implementation of this guideline could reduce the time to start moving of patients, the time spent at the hospital and the ICU, and consequently increase the beds available to the hospital and the ICU. It will also increase the patient cognitive activity in the long-term and increase the number of discharged patients to home and even preserve the lives of patients and increase their survival.[7–10]

These beliefs were confirmed in the findings of the Balas. It has been shown in that by implementing this protocol in the hospital, not only the number of hospitalized days in the ICU, which also hospital admission days reduce, the same results in our study. Based on the findings of these researchers, the safety rate of hospitalization in the section significantly improves with the implementation of the protocol, too. The need for tracheostomy, the re-intubation of patients significantly decreased in Balas's study.[10] According to the findings of our study, the patient's awakening variables improved significantly after the implementation of the protocol, so that the CI sedative decreased significantly, as well as the sedative sedation rate significantly increased, and on the other hand, the opiate SATs and SATs eligible for Opoid days significantly increased. Balas study showed that patients awakening variables were significantly improved following the implementation of the protocol, so that patients had a suitable condition as CI sedative, SAT sedative and SAT.[10] Also in a randomized controlled clinical trial to evaluate PAD implementation effects on the outcome of patients hospitalized in 2 mixed university affiliated ICUs by Mansouri, Iran, duration of ICU stay, duration of ventilatory support and mortality rate in protocol group were significantly decreased.[11]

According to our results, patients generally had free status of a ventilator, it means patients after the protocol, were generally better in the absence of ventilator and significantly days free ventilator was increased for them. This result was completely in line with Balas and his colleagues.[10] In the PAD guideline, the use of propofol as a sedative has been introduced. One of the most important aspects of the difference between this study with other studies was the lack of use of propofol due to its problems. Some problems with the use of propofol include: 1- the need for preserving the propofol in the refrigerator and the lack of clinical pharmacologist in the ICU continuously, 2- presence of multidrug resistance bugs in ICUs such as Pseudomonas and acinetobacter and klebsiella, 3- due to presence of severe sepsis and septic shock and lack of hemodynamic monitoring in ICUs, 4- over sedation and lack of BIS and precise monitoring of vigilance, 5- various reports and case reports on the use of propofol with respect to PIS and liver complications.[12,13]

Conclusion

The implementation of the protocol has led to improved hospitalization indicators, ICU Awakening Indicators, and Ventilator related indicators.

Acknowledgements

The authors are grateful to the reviewers for their constructive comments that improved the manuscript.

Competing interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

Ethics approval was gained from ethical committee of Shahid Beheshti University of Medical Science, Masih Daneshvari Hospital.

Consent for publication

This manuscript does not contain any individual person's data in any form .Therefore, consent for publication is not required.

Availability of data and material

Individual person's data is not available because of some confidential policies.

Funding

This work was not funded by any organization.

Authors' contributions

A FA provided assistance in the design of the study and data collection. B Kh did all statistical analysis and prepared the manuscript. SM H carried out the design and coordinated the study. All authors have read and approved the content of the manuscript.

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DOI: 10.15406/bbij.2019.08.00283