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Toho Journal of Medicine Vol.2 No.3 掲載論文の紹介

The recent development about fluid management in patients under surgical stress

Kotake Y

Toho J Med 2 (3): 73—79, 2016

要約 :

In this narrative review, recent development about fluid management in surgical, trauma and critically ill patients are summarized. Fluid movement across vasculature has been described by Starling principle. However, classic Starling principle may not adequately account for the clinical data and revised Starling principle has been proposed. In this revised principle, transvascular fluid movement is significantly less than previously thought and is largely dependent on hydrostatic force and healthy glycocalyx. Previously, generation of non-functioning extravascular space (third space: 3rd space) has been implicated in the generation of surgery-induced hypovolemia. However, recent investigations clearly suggest that 3rd space does not exist and question the appropriateness of supplement 3rd space loss. Actually, restrictive fluid strategy disregarding 3rd space loss achieved better patient outcome. Liberal administration of normal saline has been attributed to the development of hyperchloremic metabolic acidosis but recent data demonstrate that hyperchloremia may be cause renal damage. In this perspective, use of buffered solution is advocated.

KEYWORDS: Starling principle, third space, hyperchloremia

Factors associated with health care worker compliance with procedure manuals and rules

Fujita S, Seto K, Kitazawa T, Matsumoto K, Wu Y, Hasegawa T

Toho J Med 2 (3): 80—85, 2016

要約 :

Background: Health care workers in hospitals are expected to comply with procedure manuals and rules. We investigated factors associated with compliance with procedure manuals and rules among health care workers classified by type of compliance behavior.

Methods: In 2012, all health care workers (n = 12076) in 18 Japanese hospitals were asked to complete an anonymous, self-administered, cross-sectional, questionnaire survey. Respondents were categorized into four groups according to their responses to two questions regarding their understanding and compliance with manuals and rules in their hospital. The four groups were safe worker, intentional violator, overconfident worker, and reckless worker. A generalized linear mixed model was used to identify factors associated with classification in the latter three groups.

Results: The response rate was 75.6% (9124/12076). Being an intentional violator or reckless worker was associated with lower job satisfaction (odds ratios [ORs]: 1.67 for intentional violator, 1.65 for reckless worker) and lesser perceived supervisor reliability (ORs: 1.96 for intentional violator, 1.62 for reckless worker). The number of night shifts worked in a month was associated with being an intentional violator (OR for \geq five shifts, 2.02). Being a physician (OR, 2.21), perception of staffing as insufficient (OR, 1.33), and participation in in-house patient safety workshops during the previous year (OR, 0.49) were associated with being a reckless worker.

Conclusions: Rules compliance among health care workers was associated with job satisfaction, perceived reliability of the supervisor, number of night shifts worked in a month, being a physician, perception of staffing, and participation in in-house patient safety workshops during the previous year.

KEYWORDS: quality of health care, patient safety, compliance, violation, professional misconduct

Use of an eyeglass-type measuring device to assess exposure of the eye to light among urban office workers
Eto N, Okada K, Obana A, Okazaki S, Nishiwaki Y
Toho J Med 2 (3): 86—94, 2016

要約 :

Background: Exposure of the eye to light (EEL) has various adverse effects. High-illuminance blue light causes acute disorders of the retina and is a suspected cause of age-related maculopathy. Nighttime blue-light exposure suppresses internal secretion of melatonin, which can cause various conditions. We developed and used an eyeglass-type measuring device (Ray Sensing Glass System: RaySeG) to measure EEL levels during working hours among urban office workers, who constitute a high percentage of the workforce in Japan.

Methods: Time-dependent changes in the individual EEL levels of 39 office workers (classified as sales and deskwork groups) in Tokyo were recorded during working hours for a period of 5 days, after which mean EEL irradiance (mEEL, $\mu\text{W}/\text{cm}^2$) values for the total waveband and individual wavelength bands were estimated. The intergroup ratio of average mEEL values in the sales and deskwork groups was calculated. mEEL was divided into quartiles to evaluate differences among individuals. The ratios in each quartile were calculated, and the lowest quartile served as reference.

Results: The intergroup mEEL ratios were 4.59 (total), 4.86 (red), 4.18 (green), 4.60 (blue), and 26.5 (ultraviolet). Total mEEL for the two groups was $229 \mu\text{W}/\text{cm}^2$ (sales group) and $50.0 \mu\text{W}/\text{cm}^2$ (deskwork group). The ratio in the highest quartile of total wavebands was 2.95 in the sales group and 2.22 in the deskwork group.

Conclusions: mEEL levels depend strongly on individual behavior, and interindividual differences were large for both outdoor lighting conditions and relatively homogeneous indoor lighting environments.

KEYWORDS: exposure assessment, blue light, ultraviolet radiation, visible light, eye

The nitric oxide-cGMP pathway does not play an essential role in β -adrenoceptor-mediated smooth muscle direct relaxation in the rat thoracic aorta

Shiina S, Ui R, Endo T, Obara K, Chino D, Tanaka Y
Toho J Med 2 (3): 95—105, 2016

要約 :

Background: The smooth muscles of blood vessels express relaxant β -adrenoceptor, which functions as a negative feedback system against α_1 -adrenoceptor-mediated contraction. Although β -adrenoceptor-mediated vascular smooth relaxation is generally thought to be triggered through a cyclic adenosine monophosphate (cAMP)-dependent pathway, a recent report has suggested a principal role for the nitric oxide (NO)-cyclic guanosine monophosphate (cGMP) pathway. Thus, in this study, we examined whether the NO-cGMP pathway played an essential role in β -adrenoceptor-mediated smooth muscle direct relaxation in the rat thoracic aorta.

Methods: The effects of an NO synthase inhibitor (L-NNA) or a soluble guanylyl cyclase inhibitor (ODQ) on the relaxation responses to β -adrenoceptor agonists were examined in endothelium-denuded rat thoracic aortas. The effects of β -adrenoceptor agonists on arterial cGMP content were also examined.

Results: Both L-NNA and ODQ potently suppressed acetylcholine (ACh)-induced, endothelium-dependent relaxation. ODQ also largely suppressed endothelium-independent relaxation induced by an NO donor ((\pm)-(E)-4-ethyl-2-[(E)-hydroxyimino]-5-nitro-3-hexenamide [NOR3]). However, relaxation of the endothelium-denuded aortas in response to the β -adrenoceptor agonists isoprenaline, salbutamol, isoprenaline or CGP-12177A in the presence of propranolol, or noradrenaline was not substantially reduced by L-NNA or ODQ. Neither isoprenaline nor noradrenaline affected arterial cGMP content, whereas NOR3 caused an approximately 30-fold increase in cGMP content.

Conclusions: Our findings suggested that the NO-cGMP pathway had an insignificant effect on endothelium-independent smooth muscle direct relaxation in the rat thoracic aorta in response to β -adrenoceptor agonists of any subtype (β_1 , β_2 , or β_3).

KEYWORDS: rat thoracic aorta, β -adrenoceptor, vascular relaxation, nitric oxide-cGMP pathway, vascular smooth muscle