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COMPARISON OF THERMAL CONDITIONS UNDER A COMMERCIAL NEONATAL RADIANT WARMER AND A NEWLY DEVELOPED LARGE-SURFACE RADIANT WARMER

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Abstract

Active temperature management is a critical component in the treatment of preterm and sick neonates, significantly impacting morbidity and mortality. Improvements in neonatal survival have been closely tied to the development of medical devices capable of precise thermal control, most notably infant incubators. To facilitate access during neonatal resuscitation and clinical procedures, open care systems were introduced, with high-temperature resistive warmers (RHWs) - reaching up to 700 ℃ - becoming standard. Safety requirements for these devices are defined in IEC 60601-2-21:2020.Due to their high heat source temperatures, RHWs emit energy primarily in the IRB and IRC spectra, with up to 10 mW/cm² in the IRA range. However, RHW use is associated with increased insensible water loss and exposure to airflow, light, and noise.

This study tested a low-temperature (below 52 ℃) large surface radiant warmer (LSW) prototype, based on patent-pending technology (US18/855,652 and EP23704839.2), which emits only IRC radiation. The aim was to verify that the LSW maintains mid-point mattress temperature within 36–37 ℃ per IEC 60601-2-21:2020 (Subclause 201.3.209) and meets the distribution accuracy required by Subclause 201.12.102. Performance was compared with a commercial RHW, and energy consumption was measured in watt-hours.

Results showed that both warmers maintained stable mattress temperatures within the target range and met distribution accuracy standards. However, RHW consumed more than twice the energy compared to LSW.

Conclusion: The LSW prototype met thermal performance and accuracy standards defined in IEC 60601-2-21:2020 while consuming significantly less energy and emitting only IRC radiation, suggesting it may offer a gentler and more energy-efficient alternative for neonatal thermal care.

Keywords: *Neonatal thermoregulation, Radiant warmer, Infrared-C, Energy efficiency, Preterm infants*

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ASPIRIN RESISTANCE IN PATIENTS WITH CEREBRAL ATHEROSCLEROSIS: POSSIBLE ROLE OF MICRORNAS

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Abstract

Introduction. *Cerebral atherosclerosis remains a major cause of ischemic cerebrovascular disease, and variability in response to antiplatelet therapy may contribute to persistent vascular risk. MicroRNAs have emerged as potential epigenetic regulators of platelet function and may help explain laboratory aspirin non-response. This study investigated the association between selected microRNAs and platelet reactivity in patients with cerebral atherosclerosis receiving acetylsalicylic acid.*

Methods. *This prospective single-center cross-sectional study included 54 patients with cerebral atherosclerosis treated with low-dose acetylsalicylic acid for primary or secondary stroke prevention. Platelet aggregation was measured in vitro by light transmission aggregometry using adrenaline and adenosine diphosphate. Patients were classified as responders or non-responders according to adrenaline-induced platelet aggregation, with values above 25% indicating non-response. Leukocyte expression of eight microRNAs was quantified. Correlation, linear regression, logistic regression, and receiver operating characteristic analyses were performed with adjustment for relevant clinical variables.*

Results. *Laboratory non-response to acetylsalicylic acid was observed in 64.8% of patients. Of the eight microRNAs analyzed, only microRNA-126-3p and microRNA-126-5p showed significant inverse associations with adrenaline-induced platelet aggregation after correction for multiple comparisons. In adjusted analyses, microRNA-126-3p remained independently associated with lower platelet aggregation (β = -0.3129; p = 0.0483) and with a lower probability of non-response (OR = 0.850; 95% CI 0.684–0.968; p = 0.0466). Its predictive value was moderate alone and improved when combined with clinical characteristics.*

Discussion. *MicroRNA-126-3p appears to be a promising epigenetic marker of variability in aspirin response in patients with cerebral atherosclerosis. These findings support further prospective validation of microRNA-126-3p as a tool for identifying patients at risk of inadequate platelet inhibition on aspirin.*

Keywords: cerebral atherosclerosis, aspirin resistance, platelet aggregation, epigenetics, microRNA

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THE RELATIONSHIP BETWEEN THE EXPRESSION ACTIVITY OF GENES ENCODING VIMENTIN AND ACTIN-BINDING PROTEINS IN PATIENTS WITH SQUAMOUS CELL CARCINOMA OF THE HEAD AND NECK WITH LYMPHOGENOUS METASTASIS.

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Abstract

Aggressive head and neck squamous cell carcinoma is characterized by a high metastatic potential, with the epithelial-mesenchymal transition acting as a central driving process. The epithelial-mesenchymal transition during metastasis is driven by the remodeling of the cytoskeleton, primarily through the action of actin-binding proteins. There are no available methods for assessing the risk of head and neck squamous cell carcinoma metastasis; therefore, the study of the molecular characteristics of head and neck squamous cell carcinoma metastasis remains extremely relevant. The purpose of the study was to examine the relationship between the mRNA expressions of vimentin and actin-binding proteins (cofilin-1, profilin-1, adenylate cyclase-associated protein 1, fascin-1 and ezrin) in tumor tissue of head and neck squamous cell carcinoma patients with lymph node metastases.

Material and Methods: The analysis was carried out using RT-PCR in paired samples from The analysis was performed using reverse transcriptase PCR in paired samples from 44 patients with head and neck squamous cell carcinoma: Thirty seven patients with laryngeal squamous cell carcinoma and seven patients with oropharyngeal squamous cell carcinoma. All patients were divided into subgroups with and without lymph node metastases.

Results: Profilin-1 mRNA levels were found to be seven times higher in patients with lymph node metastases than in patients without metastases. Ezrin mRNA levels were not correlated with lymph node metastasis, but correlated with tumor stage. Vimentin mRNA levels were independent of disease stage and the presence of lymph node metastasis. High vimentin mRNA levels correlated with elevated expression of fascin-1 and adenylyl cyclase-associated protein 1 and contributed to a stronger association between cofilin-1 and profilin-1.

Conclusion: Thus, the relationship between vimentin and actin-binding protein gene expression indicates active cytoskeletal reorganization during head and neck squamous cell carcinoma metastasis.

Keywords: *epithelial-mesenchymal transition, actin-binding proteins, head and neck squamous cell carcinoma, vimentin, intermediate filament proteins, metastasis*

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LETTER TO THE EDITOR

NIPAH VIRUS PROPOSED VACCINES: ARE WE PREPARED FOR THE EXPECTED PANDEMIC?

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Nipah virus is bat-borne paramyxovirus cause a zoonotic infection. Sever and often fatal encephalitis in human. Pigs are the intermediate hosts. Nipah virus represents a serious burden to the health sector; it usually records a high mortality rate reaching up to 75% [*Tyagi S et al. 2025*].

First outbreak was recorded in Malaysia in 1998-1999 involved pig-human transmission, caused 100 deaths and massive dissemination in swine reaching up to 1.1 million pigs, this represented about 40% of swine mass in Malaysia in 1999. Consequently, other outbreaks had been recorded in Asia; Singapore in 1999, 11 cases reported after pigs' importance from Malaysia. In India, the outbreaks occurs since 2001 till present, recently in 2026 two confirmed cases were reported. In Bangladesh outbreaks almost occur regularly since 1999 [*Geisbert T et al. 2021*].

Although the scenario is believed to be less aggressive comparing with that of COVID-19 as NiV is less contagious, the substantial fatality rate had driven the urgent need to develop an effective preventive strategy. Up to now no licensed vaccine to this virus has been launched, neither for human nor for pigs [*Tyagi S et al. 2025*].

Three pig-vaccines still under consideration; adjuvanted soluble G-protein, adjuvanted stabilized F protein and adenoviral vectored G protein (ChAdOx1-G). Immunological studies in pigs revealed that each vaccine elicited distinct immunogenicity profile. Prime dose of all three recorded high degree of protection with acceptable longevity. Such vaccines would protect if not prevent virus transmission to human, reducing socioeconomic consequence associated with expected outbreaks [*McLean R et al. 2025*].

Regarding human, four Nipa virus candidate vaccines are in the clinical trial-phase 1, usually this phase include 20-100 healthy individuals. The live attenuated, vesicular stomatitis virus (VSV) -vectored, recombinant "rSVSΔ GEBOV-GP/NiV" and the adenoviral vector vaccine, ChAdOx1, both are viral vectored vaccine and both are ongoing in the clinical phase-I. A lipid nanoparticle- based messenger RNA vaccine, mRNA 1215, expressing viral glycoproteins, fusion protein (F – protein); and the attachment protein G of NiV was developed by Moderna in collaboration with Vaccine Research Center at NIAID is also in the ongoing in the 1st clinical trial. It mainly targets Malaysian strain Niv- M strain had completed in 2024 [*Kim S et al. 2025, van Doremalen N et al. 2019*].

A protein subunit vaccine, HeV-sGV, mapped out with aluminum hydroxide as adjuvant. Formulated by "Auro Vaccine LLC" in collaboration with "Program Appropriate Technology in health" and "Coalition for epidemic preparedness Innovation" has also been completed the phase-1 clinical trial. This proposed vaccine protects against Niv -Bangladesh and -Malaysian and the Hendra virus [*Geisbert T et al. 2021*].

Scholars, world-wide, identify those Asia-limited outbreaks as the tip of the iceberg and the seed from which future situation of outbreaks will evolve. Developing the aforementioned candidate vaccines make us one step closure to have NiV- approved vaccine.

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