

Light-Emitting Diodes versus Compact Fluorescent Tubes for Phototherapy

We read with interest the article by Kumar *et al.* comparing Light emitting diodes (LED) to Compact fluorescent tubes (CFT) for phototherapy in healthy term and late preterm infants from four tertiary neonatal intensive care units in India(1). Although the LED phototherapy had a higher spectral irradiance than CFT units, they achieved similar efficacy. We agree with the authors when they attribute it to the difference on the surface area covered by different light sources.

We recently reported a randomized controlled trial comparing the efficacy of a new micro processed LED phototherapy (super LED) to halogen spotlight phototherapy for the treatment of non-hemolytic jaundice in 88 premature infants(2). Super LED phototherapy is a Brazilian device system that employs a bank of LEDs with indium gallium nitrate composition. Adding indium to the semiconductor element confers significantly greater power to these LEDs than those using gallium alone. Furthermore, by means of nanotechnology it was possible to group together many LEDs in small capsules of 1cm². These capsules have been named super LED. This phototherapy device comprises five super LED capsules emitting high intensity blue light. Since the body surface area exposed to light influences the efficacy of phototherapy, we ensured that in our study all infants (in both groups) had similar areas exposed to light. Mean irradiance emitted by the super LED phototherapy was significantly higher than that emitted by the halogen unit ($37 \pm 9 \mu\text{w}/\text{cm}^2/\text{nm}$ vs. $21 \pm 6 \mu\text{w}/\text{cm}^2/\text{nm}$).

After 24 hours of treatment, the decrease in total serum bilirubin levels was significantly greater in the super LED group (28% vs. 11%; $P < 0.01$), and the duration of phototherapy was also significantly shorter (37 hours vs. 64 hours; $P < 0.01$). None of the patients exhibited temperature instability or skin rash during the study period.

In Dr Kumar's study the body surface area exposed to the light was different among the groups. Patients receiving LED phototherapy had smaller area exposed to light than those receiving CFT phototherapy. Furthermore, since light distribution (and consequently irradiance) is not uniformly distributed in LED phototherapy units(3), term and late preterm infants may actively move out of the "maximum irradiance area" and, therefore, receive less light energy. As suggested by Dr Kumar's results, increasing the illuminated area delivered by the LED phototherapy might have improved its efficacy.

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