

Operating room noise hazards during laser lithotripsy: a comparison between the thulium fiber and holmium laser platforms

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Objective and Indication

To assess and compare the impact of noise hazard during laser lithotripsy using a holmium:YAG (Ho:YAG) laser vs. a novel thulium fiber laser (TFL).

Design & Methods

- Prospective, comparative, single center clinical study.
- Noise measurements were conducted intraoperatively during ureteroscopy and laser lithotripsy cases with both laser types, TFL (SOLTIVE™ SuperPulsed Laser System Premium [Olympus]) and Ho:YAG laser (MOSES Pulse 120H Laser [Lumenis]), at three key times: prior to laser activation, with the laser on but idle, and during laser activation.
- Questionnaires capturing the effort required to perform tasks, to concentrate, and to communicate during the surgery, were assessed postoperatively by the operating room staff.

Results

- 16 TFL and 15 Ho:YAG laser lithotripsy cases were compared for noise levels.
- Ho:YAG lithotripsy resulted in significantly elevated noise levels when idling or active (mean 3.1 dB and 4.3 dB higher than TFL, respectively).
- Once turned on, the Ho:YAG laser presented with a significant rise in recorded dB compared to the baseline noise (device off). The TFL showed no statistically significant rise.
- The TFL presented a lower noise level compared to Ho:YAG laser, leading to a lower level of effort required for concentration, communication, and critical task completion, rated by the operating room team.

Key Findings

- The TFL produced 3.1 to 4.3 dB less noise than a standard Ho:YAG laser. Due to the logarithmic nature of the dB scale, this translates into less than one half of the overall noise energy.
- Due to lower noise levels, less effort was required for the operating staff to complete critical tasks during TFL cases.

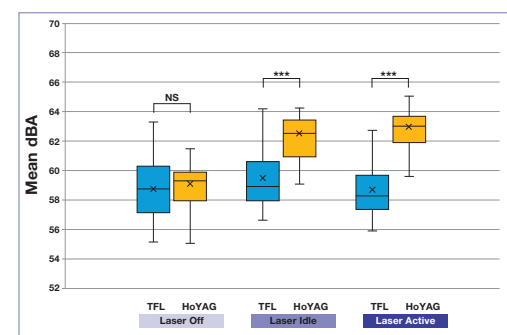


Figure 1

Conclusion

The novel thulium fiber laser (SOLTIVE Premium) was found to be more than 50% quieter than the holmium:YAG laser (MOSES Pulse 120H), allowing operating room staff to complete critical tasks with less effort.

Fig.1 Moore et al., 2022.

Mean noise measurements (dBA) for TFL and HoYAG during three time points: laser off; laser on but idle; laser on and actively lasing. (NS not significant, ***p<0.001)

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