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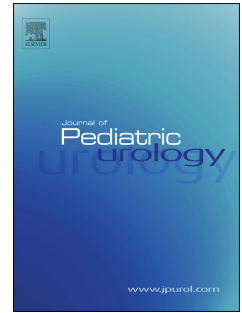
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Improvise, Adapt, Overcome: Mobile phone LED used as light source for cystoscopy and resection of posterior urethral valves in a low cost setting.

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Introduction

We demonstrate the feasibility of using an improvised light source for short cystoscopic cases. In the context of an unplanned light source failure, we were able to diagnose and treat posterior urethral valves in a 1 year old boy in a low-cost setting. This case illustrates an important point that access to endoscopic cases may not necessarily depend on purpose-built technology and demonstrates a concept that may be taken further to enable care provision in low- and middle-income countries (LMICs.)

Background

During a surgical outreach mission in western Gambia, a 1 year old boy presented to the team for diagnostic cystoscopy. A term-born baby boy, he had presented in the neonatal period with urosepsis, and hydronephrosis had been demonstrated on ultrasonography. A suprapubic catheter had been inserted and subsequently removed. He now dribbled urine. Posterior urethral valves (PUV) were thought likely but confirmatory micturating cystourethrogram (MCUG) could not be performed within the local healthcare setting. The local host institution did however have access to a functional light source, camera and laparoscopic stack. With mission planning, the visiting team had brought a cystoscope/resectoscope and plans for a diagnostic cystoscopy and resection of PUV was planned.

Surgical Procedure

Once the infant had been anaesthetised and prepared for surgery, the single remaining bulb in the light source failed; no replacement bulb or light source were available in the hospital and the surgical team considered abandoning the case.

An improvised light source was employed in this case using the LED light from an iPhone 6 in direct contact with the fibre optic cable. It is possible to increase the intensity of a mobile phone LED to more than 500 lux. This provided sufficient illumination to diagnose and resect prominent leaflets that were identified at the 5 and 7 o'clock positions.

Outcome

The patient was shown to void well at the end of the procedure and had an excellent urinary stream demonstrated on subsequent clinical review.

Discussion

This case demonstrates the possibility of improvisation in a relatively emergent context. We found that in direct contact with a high-quality fibre optic cable, a mobile phone LED clearly provides sufficient illumination for short diagnostic and even therapeutic cases. Most endoscopic light sources quote luminescence between 60,000 and 100,000 lux; but considerably lower is required for paediatric endourology procedures if direct contact is made between the source and fibre optic cable.

Portable or hand-held light sources are a technology which has been brought to market, albeit these are still in the early stages of commercialisation and

certainly have not reached our healthcare colleagues in LMICs [1,2]. This improvised light source, using readily available technology, seems to be adequate to perform simple paediatric cystoscopy in any healthcare setting.

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