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## **ETU002**

### **Image Analysis of Radiographic Cranial Examinations Using Analog Grid and AI-Based Grid**

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**Introduction:** Cranial radiography is a critical diagnostic procedure that demands high-quality imaging to accurately visualize complex anatomical structures within the skull. Traditionally, manual grids have been employed to reduce scattered radiation and enhance image contrast, thereby improving overall image quality. However, these physical grids often present limitations in clinical settings due to their cumbersome nature, increased radiation dose requirements, and reduced workflow efficiency. In response to these challenges, digital radiography systems have introduced software-based virtual grids, such as AI-enhanced grids, which aim to replicate the benefits of physical grids while improving dose efficiency and workflow flexibility. **Methods:** Despite their growing use, comprehensive clinical validation and comparative analysis between manual and virtual grids—especially in cranial applications—remain limited. This study aims to evaluate cranial image quality using both manual (analog) and AI-based virtual grids under varying exposure conditions. The evaluation criteria include contrast, sharpness, anatomical detail, and artifact presence, along with an assessment of radiation dose efficiency. Data were obtained through an experimental approach using a head phantom in the radiology laboratory at Universitas 'Aisyiyah Yogyakarta. **Results:** showed that the AI Grid at a lower exposure (80 kV, 200 mA, 10 mAs) achieved the highest average image quality score of 4.88, compared to the Analog Grid (4.47) and AI Grid at standard exposure (3.82). **Conclusions:** These findings suggest that low-dose AI Grid technology not only maintains but may even improve image quality while significantly reducing patient radiation exposure.

**Keywords:** radiography cranium, grid manual, virtual grid