Opinion

Artificial intelligence and mainframing in virtual pathology

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Ocular images , unable to be envisaged by the unaided eye, requiring magnification have advanced to be ciphered and channelized using a computer monitor and scanner, for image restoration, image dissolution, segmentation, optical calculations, adopting primarily the technique of area scanning and line scanning and other technologies for acquisition. Geometric definitions of micro images, construction of software models and numerical problem solvers are integrated in the surgical pathology workflow and database. A capacious amount of microscopic slides are scanned with an intent of primary evaluation and logistics, also archived with an intelligent retrieval system. The computed facsimile provides a huge think-tank, pooled estimates for prospective and retrospective case studies, disease prediction, progression, aggression and patient outcome.[1]

Digitizing the figures and tissue illustrations with tissue microarrays result in a high definition, high perseverance, overly magnified, multiple carbon-copies for study. The large volume of data generated would also require a streamlined and an accomplished data management system for repository, comparative scrutiny, and meta-analysis. The terrain covered with the deported replicas and telepathology/telemedicine includes teleconsultations, education, quality control, research, datasets and depots. Convenience to the virtual images are focusing on unevenly sampled areas, high resolution at specific areas of interest, components that are visibly discernible may be available by systematic analysis at a cellular and subcellular level and can generate a vast amount of information which could remain underutilized. Detailed characterization of whole slides at a micro-anatomic and morphological level with maximizing colour contrast, optimal brightness and resolution with an insistence on speed, accuracy, good quality yields information for tumour prognostication, prediction, classification, grading etc. An effort is needed to keep the images artifact free. Also there is a lack of universally acceptable formatting and guidelines. Enhancement in image quality, scan times and integration of image viewing browsers are also necessitated. The virtual analogues also depend upon clear cut regulations, validation guidelines, good medical practice, incorporation in the mainstream, standardization and modification, ensuring a cost-effective service with a potential for furtherance (Figure 1).

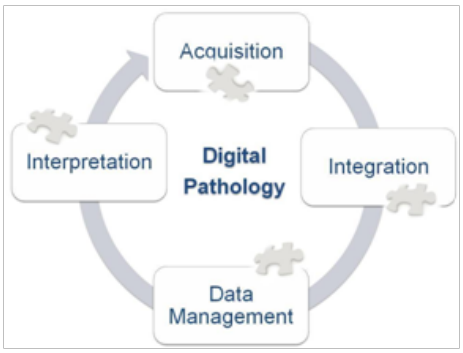

Figure 1 Generated from a digitized glass slide.

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A disproportionate use of and reliance on technology is detrimental to the patient doctor relationship, evolving risks and responsibilities with the need for clear cut guidelines for practising medicine with diagnosis, consultations and interventions from a distance. The critical consequences of virtual pathology/digitized image transfer would be our escalating dependence on technology e.g. choosing gray zones/areas of interest for examination .a diminishing skill set, an upsurge of contingencies of personal confidentiality and autonomy, using electronic instead of paper based records, a depreciating essence and integrity of professional medical services, an increment in the numbers of healthcare providers, a loss of exclusivity, a lack of tender, compassionate care that human touch can bring. Molecular imagery and the incorporation, the advantage and having recourse to proteomics and genomics in the virtual pathology framework remains to be determined.

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Conflict of interest

The author declares no conflict of interest.

References

1. The medical encyclopedia, digital pathology. *The Digital Pathology Blog, Image Courtesy*. USA; 2007.