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Editorial

Role of AI in ENT

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Technology is evolving by leaps and bounds, and computers are helping in every field. The advances in data processing are even taking tasks that often require human intelligence- such as visual perception, learning, problem-solving and complex decision-making.[1] And these machines demonstrating human-like intelligence and being able to perform human-intelligent tasks is called Artificial Intelligence (AI).

These machines work on principles of machine learning and deep learning. In machine learning large volumes of data are evaluated for pattern and relationship and create a feedback loop. In deep learning, the algorithms structured in layers are used. Then each layer analyses different part of the data and feed it back. In light of past data making predictions or deductions from new data is helpful.

It has already relieved physicians of burdensome documentation in out-patient department, by AI-powered medical scribes interpreting conversational speech and creating complete records of patient history. Based on many data points in history it could suggest differential diagnosis, recommend tests and advice regarding treatment.

In Otology the assessment of videonystagmography, and differentiating the site of cupulolithiasis by AI helps in early diagnosis of vestibular system disorders. They also play a role in improving vestibular outcomes through interactive virtual reality vestibular rehabilitation games. The auditory evoked brainstem responses have been processed and interpreted by deep learning, in an objective manner, thus avoiding subjective opinion. AI may help in deciding the appropriate hearing device after analyzing the audiological data and also adjusting the gain for different environments. Machine learning algorithms have been used to predict recovery after sudden sensorineural hearing loss. The AI has been found to have good accuracy in classifying otitis media by processing images of otoscopy.

In Rhinology, the computed tomogram and magnetic resonance images can be processed with regard to sinuses opacified or skull base structures involved and treatment planned precisely. It has helped in generating a 3-dimensional reconstruction of nasal endoscopic images.

In laryngology, early glottic malignancy can be diagnosed with high accuracy by clubbing this with voice analysis and video stroboscopy images.

In Head Neck, it has helped in the identification of 40 gene profiles for predicting nodal disease in human papilloma virus-related oropharyngeal cancers.[1] Thus, helping in the identification of high-risk patients and tailoring the treatment. It is helpful in patients receiving radiation treatment for malignancy by identifying and thus sparing the critical structures from radiation exposure. It computes the three-dimensional tumor volume and plans the dosing more realistically. Using AI along hyperspectral imaging helps in differentiating thyroid malignancy from normal tissue with high accuracy, thus enabling more precise resection margins.

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Still, there are many challenges before AI is adopted as machines lack the sensitive personal interaction seen in doctor-patient relationships. The AI requires a large set of data, which is often incomplete or unobtainable. Also, there is a risk of leak of patient confidential data and proper training of ENT practitioners in using AI is lacking. The doctors will not be able to deviate from established algorithms and the subjectivity in decision making will be absent. As happens many a time, no two patients agree to the same treatment. In 2011 IBM developed Watson for improving oncology care, but the treatment recommendations fed in were biased by the physicians who trained it.[1] Finally, the cost and resources needed for implementation of AI is a major limitation. Some centers have enacted per-use AI payments by covering either AI-specific CPT codes or a new technology add-on payment.

As an ENT clinicians, it is our role to provide high-quality data to train machine learning algorithms, which may help in making the right clinical diagnosis, prognostic predictions and treatment decisions thus benefitting the patients. This may help general physicians and medical officers in diagnosing ENT diseases and seeking timely referrals to the ENT expert.

Conflict of Interest

None.

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