Corneal reflex

The corneal reflex, also known as the blink reflex, is an involuntary blinking of the eyelids elicited by stimulation of the cornea (such as by touching or by a foreign body), or bright light, though could result from any peripheral stimulus. Stimulation should elicit both a direct and consensual response (response of the opposite eye). The reflex consumes a rapid rate of 0.1 second. The evolutionary purpose of this reflex is to protect the eyes from foreign bodies and bright lights (the latter known as the optical reflex).

The blink reflex also occurs when sounds greater than 40-60 dB are made.

Intraoperative monitoring during cerebellopontine angle surgery is widely accepted. While techniques which monitor cranial motor nerves are commonly used, monitoring the sensory afferents has been challenging. Considering the reflex arc, blink reflex (BR) might be useful in monitoring the sensory part of the trigeminal nerve, the brainstem connections and the facial nerve. We describe the case of a patient who developed hemifacial hypoesthesia after microvascular decompression surgery for trigeminal neuralgia. Intraoperative BR showed a severe loss of R1 amplitude. BR might be a useful intraoperative technique to monitor the sensory part of the trigeminal nerve [1)].

In a review, the blink reflex after trigeminal and nontrigeminal inputs, corneal reflex, levator palpebrae inhibitory reflex, jaw jerk, masseter inhibitory reflex, and corneomandibular reflex were discussed. Following description of the recording technique, physiology, central pathways, and normative data of these reflexes, including an account of the recording of recovery curves, the application of these reflexes is reviewed in patients with various neurological abnormalities, including trigeminal pain and neuralgia, facial neuropathy, and brainstem and hemispherical lesions. Finally, simultaneous electromyographic recording from the orbicularis oculi and the levator palpebrae muscles is discussed briefly in different eyelid movement disorders [2)].

A total of 120 patients with duration of unconsciousness were enrolled in this study. BSRs were recorded 14 days after Traumatic brain injury, and classified into 3 grades. Predictors including BSRs, age, sex, Glasgow Coma Scale (GCS), and cause of injury were also analyzed, respectively. The outcome was divided into 2 groups including unconscious group and minimally conscious state (MCS) group.

RESULTS: Seventy-two of 120 were minimally conscious and 48 of 120 were unconscious at 6 months from the onset of injury. The BSRs outmatched the predictive accuracy of the GCS for outcome (AUROC, 0.853; 95% confidence interval, 0.753-0.953; and AUROC, 0.655; 95% confidence interval, 0.512-0.799, respectively). BSRs grade ($P<0.001$) and GCS ($P<0.05$) were significantly associated with the outcome. The accuracy of the whole regression model for predicting unconscious and MCS was 91.7% and 79.2%, respectively.

The BSRs grade shows a significantly higher accuracy for prediction of MCS compared with the GCS. BSRs grade is a simple, yet reliable and stratification tool for early decision making [3)].

1)

Simioni V, Capone JG, Sette E, Granieri E, Farneti M, Cavallo MA, Tugnoli V. Intraoperative monitoring

of sensory part of the trigeminal nerve using blink reflex during microvascular decompression for trigeminal neuralgia. Acta Neurochir (Wien). 2017 Nov 25. doi: 10.1007/s00701-017-3405-8. [Epub ahead of print] PubMed PMID: 29177630.

2)

Aramideh M, Ongerboer de Visser BW. Brainstem reflexes: electrodiagnostic techniques, physiology, normative data, and clinical applications. Muscle Nerve. 2002 Jul;26(1):14-30. Review. PubMed PMID: 12115945.

3)

Bao Y, Mao J, Mei F, Liu F, Qi S, Qiu B. Prediction of Minimally Conscious State with Brain Stem Reflexes in Unconscious Patients after Traumatic Brain Injury. J Craniofac Surg. 2019 Mar 20. doi: 10.1097/SCS.0000000000005404. [Epub ahead of print] PubMed PMID: 30908437.