MEDIBEATS
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Large, Mid and Small Size Pupils

PUPILS

The normal size of the pupils is between 2mm and 6mm. The size of the pupils are controlled by two pathways

1. Sympathetic pathway which dilates the pupil and
2. Parasympathetic pathway which constricts the pupil.

1. DISORDERS OF THE PUPIL (LARGE PUPIL)

1. The two conditions most commonly causing a unilaterally large pupil are 3rd nerve palsy and adies pupil.
2. Because the pupillary parasympathetics occupy a position on the periphery of the nerve as it exits the brainstem, compressive lesions such as aneurysms generally affect the pupil prominently.
3. Where as ischemic lesions tend to affect the interior of the nerve and spare the pupil, as in diabetic 3rd nerve palsies because periphery of the nerve has a better vascular supply and therefore diabetic 3rd nerve palsies are sometimes known as papillary sparing 3rd nerve palsies.
4. Hutchisnson's pupil - The 3rd nerve compression because of uncal herniation causing dilatation of the pupil.

ADIE'S PUPIL

1. The patient presenting with Adie's pupil (tonic pupil) is typically a young woman who suddenly notes a unilaterally enlarged pupil.
2. The pupillary reaction to light may appear absent, although prolonged illumination may provoke a slow constriction.
3. Once constricted, the tonic pupil re-dilates very slowly when illumination is removed.
4. The pathology in Adie's pupil lies in the cilary ganglion or short ciliary nerves or both.
5. The parasympathetic denervation eventually leads to denervation super sensivity, the pupil may constrict to solutions of pilocarpine that are too dilute to affect a normal eye.
6. ADIE'S SYNDROME – is the association of the pupil abnormality with depressed or absent deep tendon reflexes particularly in the lower extremities

TECTAL PUPILS (LIGHT NEAR DISSOCIATION)

1. The term tectal pupils refers to the large pupils with light near dissociation some times seen when lesions affect the upper midbrain.
2. Such pupils may accompany the impaired up gaze and convergence/retraction nystagmus of parinaud's syndrome.

2.MID SIZE PUPILS

CAVERNOUS SINUS LESIONS

1. When the ocular sympathetics are involved along with the 3rd nerve, the pupil may be mid position because the sympathetic denervation prevents the pupil from dilating fully.
2. This occurs most often in cavernous sinus lesions when there is compression of both 3rd nerve and the pericarotid sympathetics leaving the pupil mid size.

3.DISORDERS OF THE PUPIL (SMALL PUPIL)

Important neurologic conditions causing and abnormally small pupil include Horner's syndrome and neuro syphilis (ARGYLL ROBERTSON'S PUPIL)

NEURO SYPHILIS (ARGYLL ROBERTSON'S PUPIL)

1. Argyll Robertson's pupils (ARP) are small pupils and have light-near dissocation. They react poorly or not at all to light but very well to near because papillary light pathways goes through pretectal nucleus whereas accommodation pathways do not go through pretectal nucleus.
2. AR pupils are the classic eye findings of Neuro syphilis.
3. The lesions lie in the pretectal area in rostral midbrain.

HORNER'S SYNDROME:

1. Horner's syndrome is due to the sympathetic pathway being affected which results in small pupil.
2. Pontine lesions usually produce BILATERAL small pupils because pons is supplied by a single basilar artery which if ruptures allows the blood to diffuse on both sides causing bilateral small pupils as both sympathetic pathways get affected.
3. Medullary lesions usually produce IPSILATERAL small pupil because medulla oblongata is supplied by two vertebral arteries and therefore involvement of a vertebral artery produces ipsilateral small pupil corresponding to the involvement of the sympathetic pathway on the affected side.

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