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Beevor's Sign: A Review

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Abstract

Beevor's sign named after Charles Edward Beevor is one of the eponymous medical signs in the dictionary of neurologists. The present article reviews the history and the pathophysiology of Beevor's sign. This sign is famous in Facioscapulohumeral muscular dystrophy and in the spinal cord injuries of T10. There are very few researches done regarding Beevor's sign and a little can be found in the history. On eliciting the sign, one can observe caudal movement of navel on cervical flexion. In normal individuals the position of umbilicus does not change but in patients of Facioscapulohumeral muscular dystrophy, spinal cord lesion T10 or myopathy, the umbilicus is seen to move towards the head. Very few studies have been done regarding other diseases where Beevor's sign is seen but a lot of studies have been done on faciculohumeral dystrophy and Beevor's sign. Research is needed in other diseases showing positive Beevor's sign and its management.

Keywords: Beevor's sign, Facioscapulohumeral muscular dystrophy, Umbilicus, Flexion.

Introduction

Beevor's sign (named after Charles Edward Beevor, an English neurologist and anatomist who described it)¹ is a medical sign seen when there is weakness of the lower abdominal muscles and involving the movement of the umbilicus towards the head on flexion of the neck.² Beevor's sign is a sign of functional paralysis of the muscles making the patient unable to inhibit the antagonistic muscles.

Description

Beevor's sign is a characteristic of spinal cord injury between T10 and T12 levels.³ When the patient is asked to raise his head in supine position, only the upper part of the rectus abdominis muscle contracts which pulls the umbilicus toward the head. The explanation for it is that the upper part of the rectus abdominis muscle is intact but because of the spinal cord injury the lower part is weak. In normal individuals it has been seen that, the umbilicus does not change its position when one tries to raise the head from a resting supine position. Same localizing value is shown when lower cutaneous abdominal Reflexes are absent.

Beevor's sign occurs due to paralysis of the inferior fibers of the rectus abdominal muscle resulting in the upward pull of the umbilicus by upper fibers. The nerve supply to the rectus abdominis muscle at the level of the umbilicus is T10 nerve roots. Lesions of the spinal cord or roots between T10 and 12 cause weakness of the lower part of the muscle which gives a positive Beevor's sign. In normal circumstances the muscle contracts altogether with no independent control of the upper

vs. the lower, or left vs. right fibers of the muscle. This can be understood by the fact that the umbilicus remains in a central position during contraction.

Causes

The following table shows the causes for Beevor's sign: (Table 1.)

Eliciting the Sign

Beevor's sign can be easily demonstrated by making the subject lie in the supine position, and then raise their head. Beevor's sign describes the movement of the umbilicus towards the head when performing either of these maneuvers due to weakness of the lower part of the rectus abdominis, downward movement due to weakness of the upper part of the muscle which is sometimes referred to as the inverted Beevor's sign.

(Image 2).

Validity

It has been reported that Beevor's sign has 95% sensitivity for FSHD and 93% and specificity in the other neuromuscular diseases and 100% in neurological controls.⁵ Although Beevor's sign is significantly more common in FSHD patients than in patients with other neuromuscular diseases, Beevor's sign is not as sensitive as it has been reported previously. Beevor's sign remains one of the most commonly used clinical signs in localizing the level of spinal cord trauma. A positive Beevor's sign having a localizing value was confirmed by MRI in patient who suffered reinfection with Lyme Borreliosis.⁶ It has also been reported from another study that Beevor's sign has 97% diagnostic specificity for FSHD which was similar to the results obtained from the studies conducted by Awerbuch et al and Shahrizaila. However sensitivity was only 54% in FSHD diagnosis.⁷

Review

A study investigated 28 patients with FSHD (proven by genetic analysis) and 65 patients with other neuromuscular diseases. Classical FSHD phenotype was observed in 13 patients and in 15 patients phenotype was atypical. Out of 28 patients, Beevor's sign was positive in 15 as well as in two of the 65 non-FSHD patients. In patients who showed typical FSHD phenotype, Beevor's sign was positive in 11/13 of them. Only 4/15 patients with atypical FSHD phenotype showed Beevor's sign. From this it was concluded that Beevor's sign is less frequent in patients with atypical phenotype. But Beevor's sign could help in the diagnosis of atypical cases of FSHD.⁷

It was also seen in one study that 27 of 30 such patients had positive Beevor's sign while it was absent in 40 patients who had other neuromuscular disorders. Beevor's sign which is an upward deflection of the umbilicus on neck flexion has been described in association with FSH. However, it is not unique to FSHD and either the normal Beevor's sign or the inverted form can be seen in other myopathies.⁸

However, this sign has not been emphasized in many previous published reports of FSH. Although Beevor's sign is not pathognomonic of FSH, it does appear to have a high sensitivity for it. It should not be overlooked in the assessment of neuromuscular conditions and we would argue that it should be included in the diagnostic criteria for FSH and other neuromuscular diseases.⁵ Testing for Beevor's sign is a simple screening test may help in distinguishing FSHD from other forms of facioscapulohumeral syndrome.⁹

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Table (1).

S.no	Causes
1.	Amyotrophic lateral sclerosis
2.	Facioscapulohumeral muscular dystrophy (FSHD)
3.	Adult form of acid maltase deficiency disease ⁴
4.	Spinal Cord Injury
5.	Myopathy

IMAGE (2)

Source: Google Images



Image 1

Image 2

Eliciting Beevor's Sign

Image 1 shows the person in supine position and umbilicus at the normal position. Image 2 shows shifting of umbilicus from its normal position when the person flexes the head in supine position.