Canalith Repositioning Procedure (CRP)

BACKGROUND

The Canalith Repositioning Procedure (CRP) is a non-invasive treatment for the most common cause of vertigo, benign paroxysmal positional vertigo (BPPV). Most patients who are likely to benefit from CRP may not be receiving it.

CRP was first described as a treatment for benign paroxysmal positional vertigo (BPPV) in 1992. BPPV is a clinical syndrome characterized by brief recurrent episodes of vertigo triggered by canaliths (calcium carbonate crystals) which move within the fluid-filled chambers of the inner ear. The CRP involves guiding the patient through a series of positions which results in movement of the canaliths from the region where they can cause symptoms (i.e., the semi-circular canals within the inner ear fluid chambers) to the region of the inner ear where the canaliths do not cause symptoms (i.e., the vestibule).

The canaliths normally reside on an inner ear organ called the otolith organ. These crystal particles can break free from the otolith organ and then become free floating within the inner ear chambers. In most cases of BPPV, the canaliths enter the posterior semi-circular canal where they become trapped due to the anatomy of the canal and the effects of gravity. The canaliths move in the canal when the head position is changed with respect to gravity, and the movement within the canal causes deflection of the nerve ending within the canal (the cupula). When the nerve ending is stimulated, patients experience the sudden onset of vertigo and a characteristic back-and-forth movement of the eyes called nystagmus. The inner ear organs are tightly connected to the centers of the brain responsible for controlling eye movements, which is the reason that these particles in the inner ear result in eye movements. During the occurrence of nystagmus, the affected persons actually experience their environment spinning (since the eyes are moving very quickly) about them even though they are not actually moving.

Sometimes patients will report having had head trauma before the start of attacks of BPPV; therefore, it is believed that the canaliths could have broken free as the result of head injury. But in most cases, the canaliths are believed to break off spontaneously, and this occurs more frequently with increasing age.

BPPV is very common with an estimated lifetime prevalence of 2.4%. BPPV is also the most common cause of vertigo. The symptoms of BPPV are very disturbing and can sometimes be disabling. Patients affected can become so alarmed by the symptoms that they do not get out of bed, cannot work or carry out their daily activities. Many patients present to the emergency room with these symptoms because they think they might be having a stroke. Others will present with these symptoms to their primary care physician.

Research indicates that untreated BPPV will last on average 39 days, but in some patients it can last much longer, even years in duration. BPPV can recur, and CRP can effectively and quickly treat recurrences as well.

THE CANALITH REPOSITIONING PROCEDURE

The canalith repositioning procedure was a remarkable discovery when it was first introduced. The procedure involves laying the patient back onto an examination table into a position that causes movement of the canaliths, which is the trigger of the vertigo symptoms and the nystagmus. (Figure) Moving the patient into this first position is called the “Dix-Hallpike test”. The Dix-Hallpike test is necessary to confirm the diagnosis of BPPV and localize the side (left or right) and the site (posterior, anterior, or horizontal semi-circular canal) of the canaliths causing the patients’ symptoms. If the patient has a positive Dix-Hallpike test, then the patient is guided through a series of movements (Figure) before being brought back up to the sitting position. The series of positions results in the particles moving around in the canal toward the opening of the canal. When the patient sits up quickly the canaliths fall out of the canal and back into the middle chamber where they do not cause symptoms.

Proper and effective use of the CRP requires clearly identifying the affected side, proper positioning of the patient’s head during the procedure, and waiting the appropriate intervals in-between the steps of the procedure.

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**Figure.** Canalith repositioning procedure for right-sided benign paroxysmal positional vertigo.

Steps 1 and 2 are identical to the Dix–Hallpike maneuver. The patient is held in the right head hanging position (Step 2) for 20 to 30 seconds, and then in Step 3 the head is turned 90 degrees toward the unaffected side. Step 3 is held for 20 to 30 seconds before turning the head another 90 degrees (Step 4) so the head is nearly in the face-down position. Step 4 is held for 20 to 30 seconds, and then the patient is brought to the sitting up position. The movement of the canalith material within the labyrinth is depicted with each step, showing how canaliths are moved from the semicircular canal to the vestibule. Although it is advisable for the examiner to guide the patient through these steps, it is the patient’s head position that is the key to a successful treatment. (Figure from Fife, et al. Neurology 2008;70:2067-74)

To view a video demonstration visit: http://www.neurology.org/cgi/content/full/70/22/2067/DC2

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**THE VALUE OF THE CANALITH REPOSITIONING MANEUVER**

**Evidence of Effectiveness**

Systematic reviews and Meta-analyses of Randomized Controlled Trials CRP has a very high level of evidence of effectiveness. CRP has been tested in numerous randomized placebo (i.e., sham procedures) controlled trials. Trial quality has been rigorously scrutinized on separate occasions by the Cochrane Collaboration,² the American Academy of Neurology Quality Standards Subcommittee,⁹ a multidisciplinary guideline development panel chosen by the American Academy of Otolaryngology – Head and Neck Surgery Foundation,¹⁰ and other independent groups.¹¹,¹² The summary results of all the valid randomized controlled trials indicates that CRP has a large effect size in treating patients with BPPV. In these studies, 61-80% of patients treated with CRP had resolution of BPPV compared with only 10-20% of patients in the control groups.⁶ These effect sizes translate in to a “number needed to treat” (NNT) of 1.43 to 2.44. The NNT is a statistical measure that indicates the number of patients that had to have treatment to achieve the beneficial outcome in one patient. Thus, approximately 2 patients with BPPV require treatment with CRP to eliminate the symptoms in 1 patient; this is among the largest effects achievable in clinical medicine particularly since the outcome considered was elimination of symptoms as opposed to only an improvement in symptoms. For comparison, the NNT to achieve 50% pain relief using pregabalin in fibromyalgia patients is 7.1 to 21.0.¹³
Importantly, reviews have also determined that CRP is not associated with adverse events.2,9,10

**Guideline Statements**

Recent formal guideline statements have been published in support of CRP for the treatment of BPPV.9,10 Based on findings from systematic reviews of the literature, the American Academy of Neurology concluded that CRP is “an established effective and safe therapy that should be offered to patients of all ages with posterior semicircular canal BPPV (Level A recommendation).”9

In addition, the American Academy of Otolaryngology – Head and Neck Surgery Foundation, made a recommendation that “clinicians should treat patients with posterior canal BPPV with a particle repositioning maneuver.”10

**Benefit of CRP on Functional Outcomes**

Though the disorder is labeled as “benign” it does have a substantial impact on the patient’s life and also healthcare utilization. Patients with BPPV report that the symptoms are very disturbing and often alarming, leading to an interruption in daily activities and lost days at work.4,6 Most patients with BPPV present to a health care provider and many present to the emergency room.4,7 Older people with BPPV have a high incidence of falls, depression, and impaired daily activities.14

**Impact of CRP on Healthcare Utilization**

Patients with BPPV often seek help from various arms of the health care system.4,6,7 Large proportions of these patients will undergo many unnecessary tests, including imaging studies.4,7,15 There is evidence to believe that at the current time most patients with BPPV do not receive CRP treatment.4,6,7,16 The reason for the apparent underutilization of CRP, while uncertain, may include a lack of time, awareness or coverage of the procedure.

**CRP AS AN OFFICE-BASED THERAPEUTIC PROCEDURE**

CRP is unique as a procedure because it typically does not require any special tools or equipment, and is non-invasive. The procedure requires only an examination table, of the type typical for a physician examination room. Following an accurate diagnosis, established by the history and examination, the physician determines the location of the canaliths and then guides the patient through the positions. There are other office based therapeutic procedures that also do not require special tools or equipment, and are non-invasive. These are performed after a clinical evaluation and diagnosis. For instance, a closed reduction of a dislocated shoulder or elbow require an analogous effort, namely that of a cognitive diagnostic process followed by a distinct therapeutic maneuver. The diagnostic and therapeutic units have long been recognized and codified as separate and distinct procedures, but performed on the same date by the same provider.

**APPROPRIATE PATIENT SELECTION FOR CRP**

A key aspect to the effective use of CRT is patient selection. BPPV is by far the most common cause of attacks of positional vertigo. However, in rare cases patients with positional vertigo attacks can have a structural brain abnormality (e.g., Chiari malformation, or mass lesion). Patients with structural brain lesions can typically be identified by other abnormalities on the examination or a pattern of nystagmus that is not consistent with BPPV. Some patients with dizziness caused by a migraine equivalent (i.e., so-called “vestibular migraine”) can have prominent positional components to their symptoms, but again these patients typically do not have the key nystagmus patterns of BPPV.

CRP is also not effective in patients with other causes of dizziness or vertigo such as vestibular neuritis, Meniere’s disease, orthostatic hypotension, or panic attacks.

Therefore, proper and effective use of the CRP requires appropriate patient selection, clear identification of the affected side, proper positioning of the patient’s head during the procedure, and waiting the appropriate intervals between the steps of the procedure.

**Indications:**

1. Recurrent episodes of positionally triggered dizziness characteristic of BPPV.

2. Positive finding of symptoms and characteristic nystagmus with positional testing (e.g., the Dix-Hallpike test).

**Limitations:**

1. Use of CRP in patients not having BPPV (incorrect diagnosis).

2. Incorrect performance of the individual components of CRP.
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CODING FOR CRP:

Procedure Code: 95992  Canalith repositioning procedure(s) (e.g., Epley maneuver, Semont maneuver)

ICD-10-CM CODES THAT SUPPORT MEDICAL NECESSITY:

1. All ICD-10-CM codes listed below may be viewed as medically necessary.
2. This listing may not represent an all-inclusive list of submissible ICD-10-CM codes. There may be other diagnostic codes that are deserving of consideration for coverage. Such instances may require individual consideration.

   H81.10 Benign paroxysmal vertigo, unspecified ear
   H81.11 Benign paroxysmal vertigo, right ear
   H81.12 Benign paroxysmal vertigo, left ear
   H81.13 Benign paroxysmal vertigo, bilateral

ICD-10-CM CODES THAT DO NOT SUPPORT MEDICAL NECESSITY:

   H81.391 Other peripheral vertigo, right ear
   H81.392 Other peripheral vertigo, left ear
   H81.393 Other peripheral vertigo, bilateral
   H81.399 Other peripheral vertigo, unspecified ear
   H81.20 Vestibular neuronitis, unspecified ear
   H81.21 Vestibular neuronitis, right ear
   H81.22 Vestibular neuronitis, left ear
   H81.23 Vestibular neuronitis, bilateral
   H81.41 Vertigo of central origin, right ear
   H81.42 Vertigo of central origin, left ear
   H81.43 Vertigo of central origin, bilateral
   H81.49 Vertigo of central origin, unspecified ear
   H83.01 Labyrinthitis, right ear
   H83.02 Labyrinthitis, left ear
   H83.03 Labyrinthitis, bilateral
   H83.09 Labyrinthitis, unspecified ear
   H83.2X1 Labyrinthine dysfunction, right ear
   H83.2X2 Labyrinthine dysfunction, left ear
   H83.2X3 Labyrinthine dysfunction, bilateral
   H83.2X9 Labyrinthine dysfunction, unspecified ear
   R42 Dizziness and giddiness
   R94.121 Abnormal vestibular function study

REFERENCES:


