

Comparison of treatment options in meniere's disease

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Abstract

Meniere's disease (MD) is a disease that affects the inner ear. It is formed as a result of endolymphatic hydrops. Hearing loss and vertigo are important in the diagnosis of MD. There is fluctuating and progressive hearing loss. Vertigo attacks cause severe dizziness in the patient. There are many treatment options in MD. These are hearing aid, diet, medication and surgery. In this study, we will discuss the advantages and disadvantages of the different treatment options. Treatment options have been compared to find out what the appropriate treatment is. Another concern is the importance of surgery in MD. This study is combination of qualitative and quantitative studies. Much focus will be on vertigo, and appropriate treatment options of MD will be mentioned also the importance of surgery. The main question in this study is the necessity of surgery. Surgical procedures are the most doubtful treatment option because of their indications and contraindications. In this study, it has been noticed that surgical operation should be delayed as much as possible. Priority is to try other treatment options. Surgery can be considered as a last resort. When we look at the operations performed, operations are mostly done in advanced Meniere cases.

Keywords: Comparison, Treatment Options, Meniere'S Disease.

Major classification: Health Science.

1. Introduction

Meniere's disease (MD) is a disease of the cochlea and labyrinth caused by endolymphatic hydrops. Endolymphatic hydrops is caused by damage to the reissner membrane as a result of endolymphatic fluid pressure. According to Van de Heyning et al. (2005), MD may develop as a result of less absorption or overproduction of endolymph. The incidence is approximately 5/10 000. MD is often seen as an idiopathic disease because it is difficult to determine the exact etiology. On the other hand, MD can occur as a result of a pulse, infection, degeneration of the inner ear, allergy or a tumor (Martin & Clark, 2012).

MD is characterized by spontaneous vertigo attacks, fluctuating and progressive sensorineural hearing loss, aural fullness and tinnitus. The attacks of vertigo last up to 20 minutes or a few hours. These symptoms may not appear together. Patients complain about vertigo more than other symptoms. Therefore, vertigo is more important in the treatment. Various treatment options are available for MD. Treatment options include hearing aid, diet, medications, surgery.

Surgical treatment has always been the subject of controversy. There are a few surgical approaches. Endolymphatic sac surgery is used to weaken vertigo while protecting the patient's hearing (Gelfand, 2009). Magnan et al. (2018) noted that labyrinthectomy and vestibular neurectomy are important methods in MD. In vestibular neurectomy, superior and inferior vestibular nerves are intervened. It is a selective technique that keeps the cochlear nerve safe. Labyrinthectomy is the oldest surgical treatment for MD and is currently limited to older patients. All of these approaches have their own advantages and disadvantages.

This study answers the question of which treatment method can be more appropriate considering the lack of the studies comparing treatment methods of MD. It also questions the importance of the surgical method used for the treatment of the disease.

2. Literature Review

In Meniere's disease (MD), choosing the appropriate treatment option is a challenging process. MD may have many causes. Therefore, Nakashima et al. (2016) indicate that a single treatment option is not sufficient. The course of the disease plays an important role in determining the treatment method. Different treatment options should be considered in hearing loss or vertigo. Preventing the risk of falling down and rigorous follow-up are important.

2.1. Treatment Options

2.1.1. Hearing Aid

Complaints about hearing loss are often neglected. Because patients usually complain about vertigo more than hearing loss. The selection and use of hearing aids in MD is very difficult. According to McNeill (2005), narrow dynamic range, poor speech discrimination and fluctuating hearing loss cause this condition. In the study of McNeill (2005), it has been reported that there were 43 people with hearing aids and MD. Only 27 of these people benefited from hearing aids. McNeill opposes the lack of hearing aids due to poor speech discrimination, especially in people with moderate to severe hearing loss. People can benefit from hearing aids with regular rehabilitation. Multimemory devices can be used in Meniere patients. Because it offers multiple amplification options (Martin & Clark, 2012). Additionally, signal to noise ratio should be appropriate. Van de Heyning et al. (2005) indicated that cochlear implants can be recommended for patients with severe or profound hearing loss.

2.1.2. Diet

This option takes precedence because it is the easiest method. Saeed (1998) states that reducing salt consumption and the use of diuretics could change the hydrops structure. Van de Heyning et al. (2005) also noted that patients' complaints were reduced by avoiding caffeine, salt, tobacco and alcohol. On the other hand, Sánchez-Sellero et al. (2018) confirmed that caffeine intake of 100 mg / day can not cause Meniere symptoms. In the study of Minor, L. B., Schessel, D. A., & Carey, J. P. (2004), it has been reported that these treatment measures manage vertigo in 58% of patients and protect hearing in 69% of patients.

2.1.3. Medications

Saeed (1998) indicated that acute vestibular attacks could be suppressed by drugs. Medications are effective in approximately 70% of vertigo treatment. Additionally, Nakashima et al. (2016) have shown that antihistamines are effective in suppressing the vestibular system. In the study of Magnan et al. (2018), it was stated that the use of betahistine would prevent the attacks of Meniere. Furthermore, Van de Heyning, P. H., Wuyts, F., & Boudewyns, A. (2005) have mentioned that gentamicin application may reduce vertigo attacks. Gentamicin causes atrophy in type 1 vestibular cells. Gentamicin can be used as a secondary option in cases where vertigo cannot be suppressed by other medications. This is very similar to what Minor et al. (2004) found that treatment with intratympanic gentamicin injection (IGT) can be used in cases where vertigo persists despite the best treatment option. De Waele et al. (2002) found that caloric test responds were fixed by IGT. They also mentioned that using streptomycin is as effective as gentamicin. However, intratympanic gentamicin injection should be used at low doses. Because gentamicin causes a risk of hearing loss. Magnan et al. (2018) noted that after gentamicin injection, control should be provided by tests such as vestibular evoked myogenic potential (VEMP), video head impulse test (VHIT). According to Saeed (1998), long-term use of such medications causes side effects, so it is inconvenient for the elderly people to use it. In addition, Barrs, D. M., Keyser, J. S., Stallworth, C., & McElveen, J. T. (2001) stated that steroids can be used in the treatment of vertigo or hearing loss in MD. Dexamethasone and methylprednisolone are commonly used steroids. Kitahara et al. (2008) has suggested injecting dexamethasone into the sac. According to Magnan et al. (2018), using dexamethasone is only 5% effective against ablation option.

2.1.4. Surgery

The necessity of surgical procedures has always been the subject of discussion. In his 1998 study, Jens Thomsen stated that the procedure only had a placebo effect. Van de Heyning et al. (2005) have focused on treating vertigo completely with the surgical procedure. Van de Heyning et al. (2005) have divided the objectives of the surgical

approach into three. These are reducing vertigo attacks, reducing endolymph production or increasing absorption and improving hearing. In the study of Van de Heyning et al. (2005), it was stated that approximately 20% of patients who had a negative result from conservative treatment could recover by surgical treatment. According to Minor et al. (2004), by reducing endolymph production, vertigo is treated in 50–75% of patients. They pointed out that the surgical procedure could be more considered especially in patients who have MD for a long time. Because, in the study of Havia, M., & Kentala, E. (2004), 21% of patients reported continuous vertigo even 20 years after the onset of the disease. However, they stated that the correct technique was important for this. They also emphasized the importance of postoperative care, rigorous follow-up and appropriate rehabilitation.

Moreover, Saeed (1998) stated that surgery should be considered for people who have advanced vestibular attacks. Nakashima et al. (2016) stated that ablation option is effective in the treatment of vertigo. Because, effective organs in that ear are excluded by this method. However, this method does not improve hearing loss. Moreover, due to labyrinthectomy, residual hearing is also abandoned. Therefore, Nakashima et al. (2016) just recommends labyrinthectomy for patients with profound hearing loss. According to Silverstein et al. (1991), vestibular neurectomy is the most effective way to reduce vertigo attacks in MD. Additionally, Magnan et al. (2018) indicated that vestibular neurectomy is the most effective technique in preventing Tumarkin's disorder and MD. Minor et al. (2004) have also reported that vestibular neurectomy is used to control vertigo in 90% of patients. Gates et al. (2004) remarked that using Meniett's device, 10 MD patients had intermittent pressure therapy, resulting in a significant control of the vertigo attacks and a 6 dB hearing gain. In the study of Van de Heyning et al. (2005), it was stated that it was necessary for the patient to provide vestibular rehabilitation after an ablative vestibular procedure.

3. Method

It has been emphasized in previous studies that MD has different treatment approaches, but there is no clear consensus on which of the treatment option is best. This study is focused on compiling the results of different treatment options in MD. In addition, the results of surgical treatment have been examined and the importance of surgical method has been tried to be emphasized.

In this study, previous studies have been compared. The articles written in the last 20 years have been tried to be used. Because the surgical approaches used have differ in years. On the other hand, other treatment options such as hearing aids, medications and diet have been examined. Moreover, the use of books to examine the symptoms of the disease has been useful.

This is a combination of quantitative and qualitative method. While comparing the advantages or disadvantages of treatment results, numerical datas have been used. In order to make a general judgment, verbal evaluation has been done.

It has been important to focus on the type of MD during the study. In this study, the articles which mostly studies on patients with vestibular problems have been examined. The study group of the authors are the adult group with vestibular complaints. Elderly groups have been also included to examine the people at the advanced stage of the disease. The studies of Nakashima et al. (2016) and Van de Heyning et al. (2005) are suitable for surgical comparison. In additionally, the studies of Kitahara et al. (2008), Magnan et al. (2018) and Minor et al. (2004) have provided important information about medication. During the study, the effects of the MD on hearing were only given in the hearing aid section. The study of McNeill et al. (2005) has been guiding in this part.

As a result, all of the same or different ideas mentioned by the articles have been examined. The success rates for each treatment have provided important information on the choice of appropriate treatment and the effects of the surgical approach.

4. Discussion

4.1. Hearing Aid

Intervention of hearing loss in MD is an important condition because of fluctuating hearing loss in MD. As a result of this study, hearing aids should be used in MD as well as in other hearing problems. This is critical for the patient's communication skills and speech development. However, hearing loss should be expected to be stable before the hearing aid is used. It has been concluded that the patient will get benefits from hearing aids with appropriate fitting, dynamic range and auditory rehabilitation. With this study, this approach is adopted. If the hearing loss is severe, this may not be true. Therefore the patient's low speech discrimination rate, fluctuation level, and rehabilitation

efficiency may not be sufficient. In such cases, it should be questioned whether the patient can benefit from cochlear implant.

4.2. Diet

In this study, it has been noticed that whatever treatment method is chosen, diet is also important. Diet has an important role in the onset of the disease or mild cases. Diet increases the success of surgery, hearing aid or medications. Additionally, diet is effective in suppressing endolymphatic hydrops formation. Minor et al. (2004) has also reported that the diet prevents to vertigo in 58% of patients and protect hearing in 63% of patients. Especially, reducing the consumption of salt is useful in the diet. Moreover, consuming plenty of water is important in the diet. Although Sánchez-Sellero et al. (2018) show that caffeine is not very effective on MD, I think that more researches should be done about caffeine consumption.

4.3. Medications

In this study, it is understood that drugs suppress vertigo. Especially, gentamicin and betahistine are necessary to prevent attacks. In particular, it is stated that gentamicin causes changes in cell types. Minor et al. (2004) mentioned that the best treatment option is possible with the intratympanic gentamicin injection. However, dosage adjustment is important. In particular, overdose causes side effects. In such cases, the use of steroids seems logical. On the other hand, the effect of steroids is much less than gentamicin. In general, it has been concluded that gentamicin is more effective way in Meniere patients. However, after intratympanic gentamicin injection, regular monitoring should be provided by tests such as vestibular evoked myogenic potential (VEMP), video head impulse test (VHIT). With this study, it has been concluded that the combination of drug and diet may be effective in vertigo.

4.4. Surgery

The main question in this study is the necessity of surgery. Surgical procedures are the most doubtful treatment option because of their indications and contraindications. In this study, it has been noticed that surgical operation should be delayed as much as possible. Priority is to try other treatment options. Surgery can be considered as a last resort. When we look at the operations performed, operations are mostly done in advanced Meniere cases. Surgical approaches are indicated previously as labyrinthectomy and vestibular neurectomy. In labyrinthectomy, the cochlea in that ear is abandoned. Therefore, it is a method that can be applied in total hearing loss as stated by Nakashima et al. (2016). Residual hearing no longer exists after the operation. The other method, vestibular neurectomy, is more advantageous. With this approach, Minor et al. (2004) have indicated that vertigo is controlled in 90% of patients. This approach does not affect hearing as much as labyrinthectomy. To summarize, it is concluded that vestibular neurectomy will be a better option. In addition, vestibular rehabilitation increases the gain of surgery.

5. Conclusion

In this study, it has been concluded that the level of MD is important when deciding the treatment option. The patient's primary complaint should be determined. In the next stage, the choice should be made by looking at the advantages of the treatment options. This study indicates that diet is especially important. If there is a hearing loss, the patient should be directed to the hearing aid. Vertigo attacks can be suppressed by medication. This method can be used in addition to the other option selected. Surgical approach should be considered in cases of advanced Meniere.

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