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Pineal Gland Cysts

An Evidence Synthesis Summary

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Introduction

This report summarizes information on:

- I. The effectiveness and safety of treatment options for pineal gland cysts
- II. Patient experience with treatment, and quality of life for individuals who have a pineal gland cyst
- III. A compilation of previously conducted Health Technology Assessments and Guidelines from other countries
- IV. The treatment of pineal gland cysts in other provinces in Canada

Purpose

The purpose of this research is to summarize the current evidence on treatment for pineal gland cysts, including when surgery is a necessary and/or effective treatment option.

Background Information

The pineal gland is a hormone secreting gland located in the brain¹. The main job of this gland is to produce the hormone melatonin, which controls the body's sleep/wake cycle^{2,3}. Pineal gland cysts are non-cancerous tissues that have formed on the pineal gland. The cause of pineal gland cysts is not known⁴.

A large 2011 study estimated that approximately 1% of those who had magnetic resonance imaging (MRI) had a pineal gland cyst⁵. Smaller studies have estimated this prevalence to be closer to 10%, and in autopsy studies this prevalence has been as high as 40%⁶. Pineal gland cysts are rare in very young children, frequency peaks during the ages of 19-30 (2%) prevalence and then decreases in older individuals⁶. Females have a higher prevalence of symptomatic pineal gland cysts than males⁶. MRI is considered the best way to diagnose and manage pineal gland cysts⁷.

It is very rare for a pineal gland cyst to cause symptoms⁶. The relationship between the size of a pineal gland cyst and symptoms remains unknown. Due to conflicting results reported in the published literature, the size of a cyst is not considered a rule for experiencing symptoms.

Symptoms associated with pineal gland cysts may include headaches, eye movement abnormalities, dizziness, and increased fluid in the brain⁴.

In adult patients without symptoms, most doctors agree that pineal gland cysts do not require surgery or follow-up⁶. Surgery is only considered for patients with symptoms associated with pineal gland cysts and generally excludes patients with chronic headaches in the absence of associated hydrocephalus⁶. Routine examination and imaging is often recommended for asymptomatic children, specifically those going through puberty⁶. Surgery is currently the only known treatment for symptomatic pineal gland cysts. There is no comparative evidence about which surgical approach may lead to better outcomes.

Methods

Four research methods were used in this report: (1) a systematic review on the effectiveness and safety of treating pineal gland cysts, (2) a systematic review of patient experiences and quality of life living with pineal gland cysts, (3) a review of Health Technology Assessments and guidelines, and (4) a survey concerning how neurosurgeons across Canada treat pineal gland cysts. Standardized best-practice methods (Cochrane Collaboration best practice, PRISMA Reporting Guidelines) were used for the systematic reviews, ensuring that they are rigorous and comprehensive.

Results

I. Effectiveness and Safety of Treatment Options for Pineal Gland Cysts

One hundred and twenty-three studies were identified through a comprehensive literature search. Six studies were included: three from the previous CADTH health technology assessment and three from a de novo search^{6,8-12}. The studies included were case series (a study design where a series of patients who have the same disease are given the same treatment)^{6,9-12} and chart reviews of medical files⁸. These study designs are considered low quality evidence¹³.

Despite the weak evidence base, the limited literature is in agreement. The evidence shows that surgical treatment of symptomatic pineal gland cysts relieved symptoms in 95% of individuals (79 out of 83 participants in the included studies). A number of adverse events were reported

after surgery, although all were temporary. No safety concerns related to surgery or long-term adverse events were reported.

II. Patient Experience with Treatment, and Quality of Life for Individuals Who Have a Pineal Gland Cyst

113 abstracts were identified through the comprehensive literature search. Five of these were thought to be relevant based on their abstract. The full articles for these five studies were reviewed.

None of these five studies were found to be relevant; no studies were included. There is no evidence on the patient experience, living with pineal glands cysts or patient attitudes towards treatment.

III. Previously Conducted Health Technology Assessments and Guidelines

A previously published Health Technology Assessment, written by the Canadian Agency for Drugs and Technologies in Health (CADTH) in 2012, was found¹⁴. The CADTH report did not find any national or international clinical guidelines. This health technology assessment concluded that there was not enough information to be able to know whether surgical treatment of pineal gland cysts was effective or safe. It also concluded that best practice for pineal gland cyst treatment is not known¹⁴.

IV. Treatment of Pineal Gland Cysts in Other Provinces

Three of twelve neurosurgeons responded to our survey; one from Nova Scotia, one from Quebec and one from Alberta. All three indicated that surgery is done within their provinces when: a) the cyst is growing, b) the cyst is causing increased fluid in the brain, and c) a solid component that can be seen with contrast enhancement on MRI.

Two surgery options are available in Alberta: a less invasive method using an endoscope (which is a small flexible tube that can be inserted into the body and used for diagnosis or treatment),

and open surgery. The endoscopic method is most frequently used. No other treatment option was identified.

Limitations

The evidence base for pineal gland cyst treatment is weak with only the weakest study design (case series) applied. Randomized controlled trials provide the highest quality evidence. As participants are randomly selected to receive the treatment or its alternative, this study design establishes whether a specific treatment is responsible for the outcome achieved. However, for treatment of pineal gland cysts, it is unlikely that studies of this type will be conducted. It is more probable that additional case series, including greater numbers of patients, will be published. These additional case series would be helpful to continue to develop the current evidence base on pineal gland cysts although they will not increase the level of evidence as categorized within the evidentiary hierarchy.

No evidence is published on the patient perspective. Future research on patient experiences and quality of life for those with pineal gland cysts is necessary to understand quality of life for individuals with symptomatic pineal gland cysts. This research is particularly important given the number and variety of symptoms associated with pineal gland cysts, and the invasive nature of surgical treatment.

Conclusions

- The evidence published on treatment of pineal gland cysts is weak; however, the literature is in agreement that surgery for symptomatic pineal gland cysts is effective at relieving symptoms.
- There is no comparative evidence concerning which surgical approach may lead to better outcomes.
- Surgery does not cause significant long-term side-effects .
- There is no evidence on patient quality of life, attitudes towards treatment of experiences living with pineal gland cysts.

- In Nova Scotia, Quebec and Alberta, neurosurgeons report that surgery for pineal gland cysts is done when additional fluid is present in the brain, the cyst enlarges, and when there are signs that the cyst is compressing nearby structures. Indications for surgery are similar across these three provinces and in-line with the evidence reporting that surgery relieves symptoms.

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