

Integrated headache care at the outpatient headache center of the University Hospital of Munich: The Munich model

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Clinical & Translational Neuroscience
July-December 2018: 1–7
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DOI: 10.1177/2514183X18786844
journals.sagepub.com/home/ctn



Abstract

Primary headaches, especially migraine, are common disabling neurological disorders with recurrent headache attacks that affect approximately 12–60% of the population. Depending on headache frequency, migraine is often associated with a high socioeconomic burden and a low quality of life. In order to provide adequate treatment for severely affected headache patients, integrated headache care has been established in Germany. It is based on a multimodal and multidisciplinary approach assessing headache diagnosis and offering therapy that has been shown to be effective. This article provides an overview of the structure of integrated headache care at the outpatient headache center at the Munich University Hospital (Upper Bavarian Headache Center). We present different modules of outpatient, day hospital, and inpatient care and discuss clinical outcome for patients utilizing integrated care at our center.

Keywords

Primary headaches, chronic migraine, episodic migraine, multidisciplinary treatment, comorbidity, integrated headache care, preventative care, outpatient care

Introduction

Primary headaches, namely migraine, tension-type headache, and the trigemino-autonomic cephalalgias, are some of the most frequent clinical problems seen by general practitioners or neurologists.

Migraine is a common disabling neurological disorder with severe headache attacks lasting 4–72 h and accompanying symptoms such as photophobia, phonophobia, and nausea. Episodic migraine with 14 or less headache days per month is distinguished from chronic migraine with more than 15 headache days/month.¹ Tension-type headache is, besides migraine, a highly prevalent primary headache, mostly with a light to moderate pain intensity and mild accompanying symptoms.¹ Despite the high prevalence, tension-type headache isn't seen often in clinical practice because patients rarely seek medical help for this headache.

Cluster headache is defined as a unilateral severe headache lasting 15 min to 3 h with trigemino-autonomic signs

such as conjunctival injection, lacrimation, nasal congestion, or rhinorrhea.¹ Additionally, restlessness and agitation during these headache attacks are reported frequently.

About 60% of the population is affected by primary headaches (1-year prevalence). About 12% have migraine, occurring 2–3 times more often in women than in men. Migraine occurs mainly between the age of 25 and 55 years with a peak prevalence between 30 and 39 years of age, during the peak employment years.² Chronic migraine occurs in 0.9–2.2% of the population.³

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In the German population, the 6-month prevalence of migraine is approximately 11% and chronic migraine occurs in 0.2–2.0%, similar to the prevalence in other industrial nations.⁴

Especially chronic headaches, defined as headaches occurring for more than 15 days/month, are often associated with psychiatric comorbidities and psychosocial factors. This is best investigated in migraine but also known for chronic tension-type headache and chronic cluster headache or active episodic cluster headache.^{5,6}

In conclusion, headache is one of the most frequent complaints in the population that especially affects the working generation and is substantially associated with psychiatric and psychosocial factors.

Socioeconomic burden

Migraine is one of the neurological disorders with the highest overall burden in the population under the age of 50 years.⁷ It is associated with a variety of comorbidities, as well as with low health-related quality of life (HRQoL). The economic burden is high in respect of direct and indirect health care costs, especially in chronic migraine patients.⁸

Chronic migraine (CM) patients are significantly more often severely disabled (MIDAS grade IV) compared to episodic migraineurs (78 vs. 23%). The International Burden of Migraine Study (IBMS), a Web-based, cross-sectional survey performed in 10 countries, showed that CM patients have a significantly lower HRQoL than episodic migraine (EM) patients and are more likely to suffer from severe disability. This includes inability to work and to attend social activities.⁹ In the 2005 American Migraine Prevalence and Prevention Study (AMPP), based on a validated, self-administered headache questionnaire released to a random sample of 120,000 US households, CM patients missed approximately three times more often family activities when compared to EM patients. Sixty percent of CM patients report reduced productivity in their daily lives and more absent days at work compared to EM patients.¹⁰

The IBMS study has demonstrated that during a 3-month period, CM patients had an overall productivity loss of about 68 days compared to 14 days in EM patients when measured in the Migraine Disability Assessment Score (MIDAS).⁹ During a 3-month period, direct health-related costs are approximately US\$1036 for a CM patient compared to US\$383 for an EM patient.⁹

In Germany, direct health care costs of migraine have been estimated to approximate €2 billion with additional indirect costs of €7 billion per year.¹¹

Patients with CM contact primary care physicians twice as often as EM patients and are more likely to utilize emergency departments, hospitals, and diagnostic testing than EM patients.^{9,12}

Psychiatric and other comorbidities

In general, migraine is associated with a variety of comorbidities. In the following section we focus mainly on psychiatric comorbidities, a bidirectional relationship between these disorders is suggested although biological mechanisms aren't well understood. Mood and anxiety disorders are two to four times more prevalent in migraineurs compared to the general population. Psychiatric comorbidities are, despite their high prevalence, often missed.¹³

Depression is a common comorbidity of migraine. Several studies have demonstrated significantly higher rates of depression in migraineurs compared to non-migraine study participants (47% vs. 17% and 40.7% vs. 16%).^{14,15} Patients with chronic migraine are even more likely to be diagnosed with depression compared to patients with episodic migraine. In a group of 2735 migraine patients including 68% with chronic migraine, 63.8% had depression according to a Web-based survey.¹⁶ Chronic migraineurs are two times more likely to be depressive than EM patients. Also, depression is a major risk factor for chronification of migraine.¹⁵

Besides depression, anxiety disorders, such as generalized anxiety disorder, panic disorder, and specific phobias as well as obsessive-compulsive disorders are more common in migraine patients.¹⁵ Migraine patients have a 4–5 times higher risk to suffer from generalized anxiety disorder and a 10 times higher risk to be diagnosed with a panic disorder.^{17,18} Prevalence of anxiety disorders is also higher in patients with CM than EM and anxiety disorder is a significant predictor for chronification.^{9,15}

Other psychiatric disorders, such as posttraumatic stress disorder (PTSD), are also more prevalent in migraine patients than in the general population and more common in patients with CM than EM (30.3% vs. 22.4%).^{15,19,20}

Furthermore, chronic pain syndromes (i.e. low back pain or arthritis) are also more prevalent in CM patients than EM patients (31.5% vs. 15.1%).²¹

Chronic migraine is additionally comorbid with obesity, cardiovascular disease, and sleep disorders.²¹

In conclusion, psychiatric and other typical comorbidities have to be evaluated in every patient with migraine, because these are likely to interfere with treatment outcome, are risk factors for migraine chronification, and are associated with a further increased impairment in quality of life.

Concept of integrated headache care

Treatment for chronic pain conditions requires a multimodal and multidisciplinary treatment concept that considers chronic pain together with its accompanying comorbidities in a biopsychosocial model. In this respect, multimodal refers to the treatment of patients using patient education, optimizing medical treatment and the support by cognitive-therapeutic methods and physical therapy.²²

For this, different medical specialties work together in a multidisciplinary and multi-professional approach. The core team in integrated headache care encompasses neurology, behavioral psychology, and physical therapy. Other specialties include psychiatry, psychosomatic medicine, orthodontics, or orthopedics, which can be consulted if necessary.

The concept of the multimodal and multidisciplinary headache therapy in outpatient settings is well established in Germany and its effectiveness has been demonstrated.²³

Aim of integrated headache care

Integrated headache care requires a thorough workup at the initial presentation to answer two major questions: the correct diagnosis (e.g. cluster headache may have been misdiagnosed as migraine or migraine as cervicogenic headache, etc.) and the identification of comorbidities and psychosocial factors. As demonstrated above in detail, migraine and especially chronic migraine are associated with multiple comorbidities and accompanying psychosocial factors that also influence the clinical course substantially. In general, reduction of migraine days and sufficient attack therapy as well as improvement of quality of life, daily life functionality, and treatment for migraine comorbidities are the main goals of the comprehensive treatment approach of integrated headache care.

The basis is still improvement of pharmacological acute and preventive migraine therapy to reduce headache days and prevent chronification.

However, the preceding paragraphs have demonstrated that pharmacological treatment alone might be insufficient. Improvement in quality of life involves an increase in self-efficacy and self-reliance of migraine patients. This might be achieved by different measures including patient education and a reduction of inadequate sickness behavior. Education of the patient allows a shared decision-making with an improved adherence to therapy that also may increase the satisfaction with the treatment. By improvement of self-efficacy, pain intensity might be reduced.^{11,24} As already outlined, psychosocial factors and comorbidities can have a big impact on migraine treatment and are often under-recognized. In this regard, integrated headache care pays special attention to these confounders and their adequate treatment.

Another aim of integrated headache care is to reduce inadequate health care utilization by migraine patients and to improve the cost-efficacy of headache care. One reason for underrepresentation and undertreatment of headache disorders in Germany is the poor remuneration of predominantly narrative-based medicine that includes care for headache patients. This might also be a reason for the underrepresentation of headache centers at German university hospitals, which might be improved by integrated headache care.^{11,24}

Components of multidisciplinary therapy

Patient education

Patient education is an important module of the multidisciplinary therapy to give patients a comprehensive understanding of headache pathophysiology, symptoms, and treatment approaches, including acute and prophylactic headache treatment. Typical issues and misunderstandings can be discussed in a group that often shares the same experiences.^{8,25} Patient education improves significantly compliance and adherence to pharmacological treatment, increases quality of life, and reduces disability and migraine frequency.²³

Pharmacological treatment

Naturally, acute and prophylactic treatment has to be optimized in order to enable effective multidisciplinary therapy. Since only 50% of patients using prophylactic treatment experience a 50% reduction in their monthly attack frequency,²⁶ prophylactic medication has to be continuously reevaluated and changed, if necessary. There are different options available for acute and prophylactic treatment, and a discussion would go beyond the scope of this review. Headache patients often might have to try several medications until the best working drugs are found. In this respect, prophylactic treatment should be chosen also based on individual comorbidities and side effects.

Psychological treatment

Psychological treatment is a key component of the multidisciplinary treatment approach. It is effective in terms of reducing the frequency of headache attacks and lowering the burden of disease.²⁷ The reduction of headache activity is even substantial over multiple years.²⁸ Based on the biopsychosocial model, its aim is to identify and alter influencing factors, such as catastrophizing, fear avoidance and endurance/over-activity—factors that can maintain migraine.²³

The psychological assessment includes history, psychological testing, and education. As a part of psychoeducation, patients receive information about the interaction of physical, psychological, and social factors in the development and maintenance of their pain (biopsychosocial model). In addition, the role of lifestyle factors and coping strategies for stress and pain in the progression of headaches are illustrated.

Different evidence-based methods are available for psychological treatment that can be administered alone or in combination: relaxation therapy, biofeedback, cognitive behavioral therapy, and stress management.²⁹ If there is high disability due to headache and psychiatric comorbidities, we help patients find a psychotherapist and/or psychiatrist for further treatment.

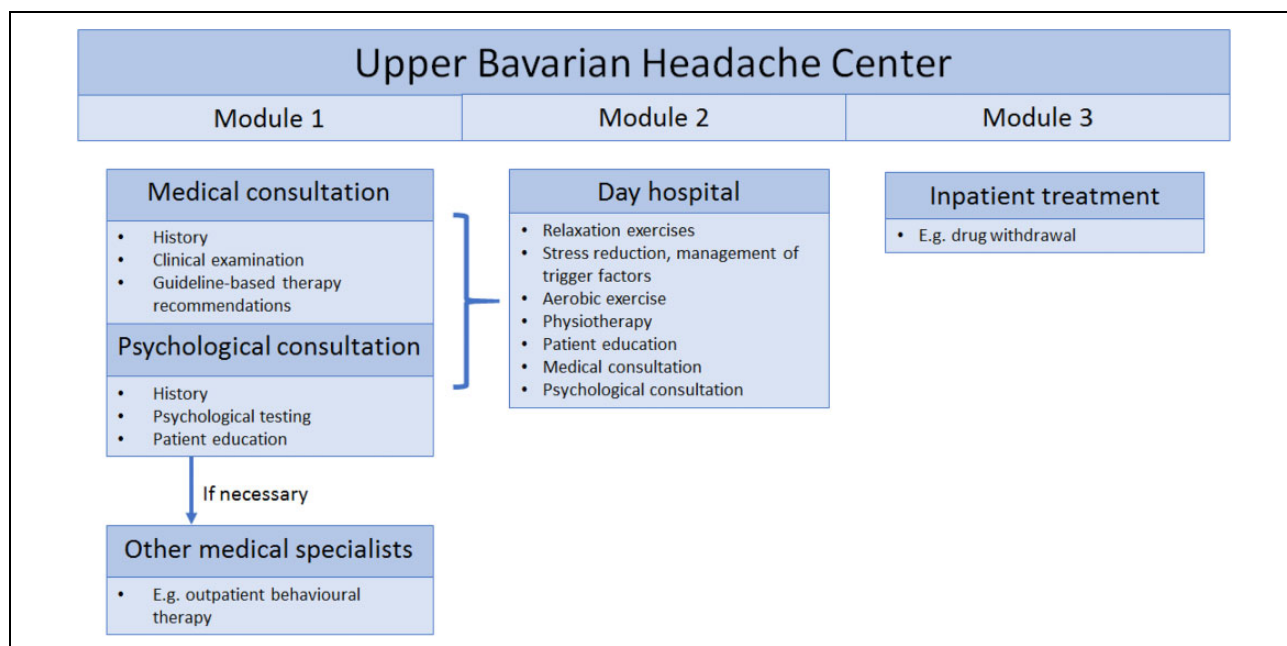


Figure 1. Structure of the integrated headache care at the Upper Bavarian Headache Center.³⁴

Physiotherapy

Many migraine patients report musculoskeletal problems, such as neck pain—often reported as a “trigger” for migraine—and lower back pain.^{30,31} Physiotherapy addresses these problems, but it has to be stressed that patients are motivated to active strategies, and passive methods such as manual therapy or trigger point therapy should be avoided or used only in combination. Aerobic exercise on a regular basis can reduce headache activity in addition.²³

In this respect, physiotherapists evaluate such musculoskeletal problems and assist finding an individual therapy program best suited for every patient. Patients should continue these active training independently. To date, only little evidence is available for the efficacy of physiotherapy, but there is broad consensus that the combination with other treatments of the multidisciplinary approach might be more efficient.³²

Structure of integrated headache care

The Integrated Headache Care at the Upper Bavarian Headache Center (Oberbayerisches Kopfschmerzszentrum) in Munich was founded in September 2006 with the implementation of the statutory health insurance modernization law (§140 ff. SGB V; “GKV-Modernisierungsgesetz”) that enabled direct contracts between health insurance and health care provider. Since the 1990s, studies existed demonstrating that patients with chronic headaches are under-recognized, under-diagnosed, and under-treated necessitating specific approaches for these patients.³³

The integrated headache care combines outpatient, day hospital, and inpatient modules. Specifically, outpatient appointments involve a medical and psychological consultation (module 1), and the 1-week day hospital involves broad education and individual interdisciplinary treatment approaches (module 2). Additional treatment options are, depending on the individual patient requirements, biofeedback and group classes of progressive muscle relaxation. If necessary, inpatient treatment can be offered. This applies to severely disabled headache patients due to high headache frequency, chronicity, associated psychiatric disorders, or psychosocial problems, for example with long-standing refractory headache or mainly unsuccessful attempt of outpatient withdrawal (module 3). The structure of the integrated headache care at the Upper Bavarian Headache Center is shown in Figure 1.

The interdisciplinary team consists of the clinical head (a licensed neurologist and pain therapist), two part-time neurology residents, one part-time psychologist, and two physiotherapists who develop individual physiotherapy and exercise for the day hospital. All team members have special interest and experience in headache care.

The integrated headache care implies a cooperation between practice-based licensed neurologists who can refer patients with ongoing chronification or a tendency for chronification, inadequate therapy response, therapy failure, or rare or unclassifiable headache syndromes. Further, participating health care insurances identify patients with a high consumption of acute medication or absenteeism at work/school and recommend a consultation at an integrated headache care center.

Module 1: Outpatient visit

In module 1, the first contact takes place during an outpatient appointment including both a medical and a psychological consultation. Different aims include evaluation of diagnosis, optimization of acute and prophylactic medication, and the evaluation of comorbidities with a focus on psychiatric comorbidities, which are common and often missed as outlined above.¹³ In this setting, patient education, possible non-pharmacological treatment options, and behavioral measures are discussed.

As a part of the medical consultation, the physician first takes the medical history and performs a clinical neurological examination. The medical history includes particularly the number of headache days during the last 3 months, accompanying symptoms, previous and current medication, comorbidities, and family history. There are certain clinical assessments to evaluate the impairment of everyday life by migraine, for example, MIDAS,³⁵ and to evaluate the psychiatric comorbidities, for example, Depression Anxiety Stress Scales (DASS). Patients are asked to bring completed MIDAS and DASS questionnaires³⁶ to the consultation. Especially the DASS assessment may indicate an anxiety disorder or a depression.

Headache diagnoses are made according to the International Classification of Headache Disorders 3rd edition (ICHD-3) mainly by the medical and headache history and clinical neurological examination. If necessary, additional tests are performed (e.g. laboratory, lumbar puncture) or ordered (e.g. neuroimaging) to assess for possible secondary headaches.³⁷ Depending on the results, other medical disciplines (e.g. psychiatry, neurosurgery, orthodontics) might be involved at this point.

After establishing the diagnosis, previous treatment is reviewed and treatment options will be discussed. In general, a headache diary is useful to measure headache frequency over time to evaluate the response to prophylactic treatment as well as to assess intake frequency of acute medication.

Pharmacological headache prophylaxis is chosen according to national guidelines and physician's experience. In particular, comorbidities and anticipated side effects of acute and prophylactic drugs are considered. Furthermore, non-drug treatment options are presented involving regular aerobic exercise, sleep hygiene, and relaxation techniques, such as progressive muscle relaxation.

In respect of the multidisciplinary and multimodal concept of integrated headache care, the medical consultation is always followed by a psychological consultation to detect accompanying psychosocial factors and psychiatric comorbidities.

The physician and the psychologist then discuss the case and decide on individual treatment recommendations.

With this information, many patients can be referred back to the practice-based neurologist for further treatment (module 1a). If patients show significant comorbidities or a high frequency of headache, follow-up visits can

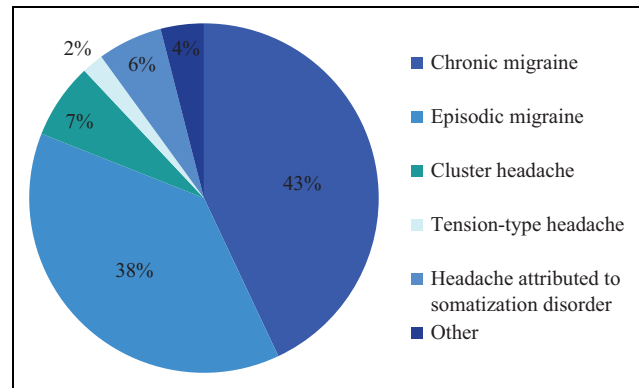


Figure 2. Distribution of diagnoses at the Upper Bavarian Headache Center in 2017.

be arranged or patients can be offered participation in module 2.

Module 2: Day hospital

Besides the typical outpatient consultation, participation in a 1-week day hospital is offered to selected patients within the integrated headache care. Typically, this program is useful for patients with frequent, chronic, or complicated headaches.

The day hospital comprises multimodal and multidisciplinary daily group sessions in small groups of 5–10 headache patients and individual medical and psychological consultations.

Each day includes medical and psychological education sessions, physiotherapy, and sports therapy as well as relaxation techniques.

The medical and psychological sessions aim to enhance patient education in order to strengthen the ability to cope with headache. Topics include headache classification, pathophysiology and symptomatology of migraine, complications and comorbidities of migraine, and possible acute and prophylactic medications next to non-pharmacological approaches.

In psychological sessions, headache-promoting lifestyle factors and coping strategies will be identified, and general acceptance of the disorder will be enhanced. Besides patient education, these settings allow patients to share their experiences and discuss their individual approaches to migraine.

Physiotherapy and sports therapy is an important module to activate patients. It is well accepted that cardiovascular training on a regular basis has a prophylactic effect.²³ During these sessions, physiotherapists introduce different forms of exercise and evaluate the options that might fit best for patients including integration in their everyday life.

Efficacy of integrated headache care

An important question is whether the effort of integrated headache care results in an improvement for headache

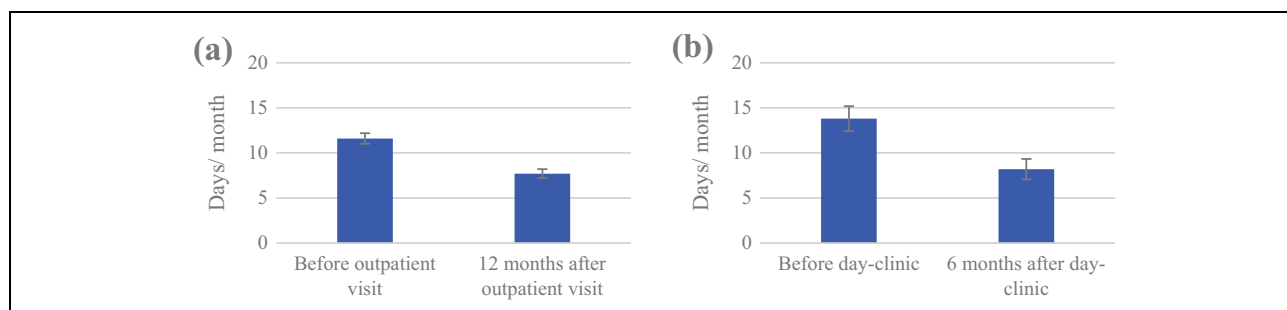


Figure 3. (a) Headache days/month before and 12 months after initial outpatient visit at the Upper Bavarian Headache Center ($p < 0.001$). (b) Headache days/month before and 6 months after participation in day-clinic at the Upper Bavarian Headache Center ($p < 0.001$). Values are mean \pm standard error.

patients. Within the scope of the integrated headache care, every year a statistical analysis is performed in order to discuss issues such as patient outcome, needs, and efficacy of treatment.

In 2017, based on 203 integrated headache care patients seen in the outpatient setting, 43% of the patients were diagnosed with chronic migraine, 38% with episodic migraine (migraine without aura: 29%; migraine with aura: 9%), 7% with cluster headache, and 2% with tension-type headache. A small percentage had other diagnoses (Figure 2).

All patients within the integrated headache care are invited to participate in a follow-up survey 1 year after their initial outpatient consultation. Here, we present data of 254 outpatient patients seen from April 2007 to December 2016. This evaluation indicated an average decrease in headache frequency from 11.6 ± 7.8 days/month prior to the outpatient consultation to an average of 7.7 ± 6.6 days/month, 12 months after consultation ($p < 0.001$; Figure 3). More than 80% of patients indicated to be very satisfied or satisfied with the treatment and 63% reported headache improvement after 1 year. Patients also reported adherence to treatment recommendations after 1 year: 70% of the patients used the recommended medication, 40% practiced regularly progressive muscle relaxation, 64% did regular aerobic exercise, and 58% reported a change in lifestyle (e.g. regarding sleeping patterns or stress management).

The day hospital (module 2) was also rated positively, evident from a more than 90% satisfaction rate six months after participation. In this survey, 173 patients were included from April 2007 to May 2016. For module 2, the results show a significant ($p < 0.001$) decrease in headache frequency from an average of 13.8 ± 7.6 days/month prior to day-clinic treatment to an average of 8.2 ± 6.2 days/month after 6 months (Figure 3). Almost 82% of patients reported that their headaches had improved 6 months after participation in the day hospital program. The therapeutic options proposed and practiced during the day hospital were still regularly implemented after 6 months. Thus, 81% of patients used the recommended medication, 58% practiced progressive muscle relaxation

regularly, 76% did regular aerobic exercise, and 70% reported a change in lifestyle.

These results demonstrate that our multimodal and multidisciplinary approach is efficient for headache patients similar to the outcome of other German integrated headache care programs.^{22,38,39}

Conclusion

Chronic headache syndromes are best treated by a multidisciplinary and multimodal approach. High prevalence, socioeconomic impact, and frequency of comorbidities of chronic headache, especially migraine, require a comprehensive treatment, as implemented in the structure of integrated headache care at the Upper Bavarian Headache Center.

Depending on the individual patient needs, different modules (outpatient, day hospital, and inpatient) can be offered to patients. Patient satisfaction, compliance rates, and outcome (e.g. the reduction of headache days per month) clearly show the necessity and potential of the integrated headache care approach with long-term benefits for patients.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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