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Impact of considering occipital nerve blockade in differential diagnosis of headache on cost and workday loss

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ÖZET

Baş Ağrısının Ayırıcı Tanısında Oksipital Sinir Bloğunu Düşünmenin Maliyet ve İş Gücü Kaybı Üzerine Etkisi

Tedavide başarı elde edilememiş baş ağrısı olgularında makul olmayan miktarda testler, hastane ziyaretleri ve iş gücü kaybı tartışma konusudur. Mevcut çalışma (geçmişe dönük vaka kontrol çalışması), baş ağrısının topluma maliyetinin tahmin edilmesi ve büyük oksipital sinirin bloke edilmesinin işe yarayan düşük maliyetli tanı koymada etkinliğini araştırmak için tasarlandı. Baş ağrısı ile müracaat eden 136 hastanın 64'ü çalışmaya dahil edildi. 64 hastanin 30'u baş ağrısı nedeniyle ilk defa değerlendirilmekteydi (grup A). Ancak kalan 34 kişi ise değişik kliniklerde çok sayıda tetkik ile değerlendirilmişlerdi(grup B). Tüm hastalara anket uygulandı ve arkasından oksipital sinir bloğu yapıldı. İşlemin başarını değerlendirmek için görsel analog ölçüt kullanıldı. Grup B'de ortalama iş gücü kaybı 33.4 ± 21.3 gün (10-90 gün), grup A'da ise 5.6 ± 1.8 gün (1-10 gün) olarak saptandı. Grup A'daki hastalara en az tetkik ve maliyetle oksipital nevralji ve boyun kökenli baş ağrısı tanısı kondu. Büyük oksipital sinirin bloğu, oksipital nevralji ve boyun kökenli baş ağrısında en düşük maliyetle hem tanıda işe yarayan hem de tedavi eden yöntem olarak ortaya kondu.

Anahtar Kelimeler: *TAP Blok, Postoperatif Ağrı, Sezaryen, Levobupivakai*n

SUMMARY

An unreasonable amount of tests and excessive hospital visits and workday loss is a matter of dispute in failed headache cases. Current study was designed (retrospective case control study) to estimate the burden of headache on society and investigate the efficacy of great occipital nerve block in providing a cost-effective working diagnosis. 64 patients among 136 outpatients presenting with headache were enrolled in the study. For 30 of 64 patients (group A), it was the first time that they were being evaluated for headache. However, 34 of 64 patients (group B) were previously evaluated at various clinics with numerous tests. All patients answered a questionnaire, and subsequently occipital nerve blockade was performed. Visual analog scale was used to measure the efficacy of the procedure. Mean workday loss was 33.4 ± 21.3 days (min 10, max 90 days) in Group B and 5.6 ± 1.8 days (min 1, max 10 days) in Group A. Patients in the group A had the diagnosis of ON or CHA with the use of least number of tests and cost. GON blocks both as diagnostic and therapeutic intervention provided a cost-effective working diagnosis of CHA and ON.

Key words: *Cervicogenic; Economic burden; Headache; Nerve blocks; Occipital neuralgia*

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Introduction

Headache is the most prevalent pain disorder that affects more than half of the global population, namely by disturbing both quality of life and work productivity of the afflicted. Besides, it burdens a not inconsiderable amount of cost on the society.

Many people have been suffering from headache that is refractory to currently available pharmaceutical agents, which aim alleviating acute headaches or preventing certain types of well-defined headache syndromes. Neck pain and tenderness at the cervical muscles are prominent symptoms of headache disorders (1). Pathophysiology of the pain is a matter of dispute but it is most likely referred from muscular, neurogenic, osseous, articular, or sometimes vascular structures in the neck (2-9). Although diagnostic criteria have been established for cervicogenic headache (CHA), sometimes it may be difficult to distinguish from primary headache disorders, which cover migraine, tension type headache, or hemicrania contunia. Neck pain and tension in the muscles of the neck are common symptoms with which a migranieur can present. Likewise, head pain that is referred from the bony structures or soft tissues of the neck known as "cervicogenic headache" is often a sequel of head or neck injury (1-4, 7, 10-15).

Occipital neuralgia (ON) is a specific pain disorder characterized by pain that is isolated to sensory fields of the greater or lesser occipital nerves (4, 6, 16-22). There are no neurologic findings of cervical radiculopathy, though the patient might report scalp paresthesia or dysesthesia. It is often difficult to determine the true source of pain in the described CHA and ON circumstances. Therefore, these patients are subject to diagnostic imaging studies such as radiography, magnetic resonance imaging (MRI), computed tomography (CT), sonography, and electromyography (EMG). Although these tools cannot confirm the definitive diagnosis of headache, in the hope of lending support to the diagnosis of the underlying pathology, each physician is usually adding new and quite expensive procedures. Consequently, the diagnoses of CHA and ON both impose an enormous health burden on the individual sufferers and the society. It is very common that these patients appear in the clinics presenting previously performed numerous tests and procedure to the consideration of the physician. So far as we have observed, despite their high prevalence and disabling effects, the burden it has been imposing had been underestimated, therefore the CHA and ON have not received adequate attention as a health priority. Although the overall cost attributable to CHA and ON is difficult to measure, most of the impact is found to be associated with disability and health care resource use in addition to consequent indirect costs to employers (23-28). The present study has been designed so as to estimate the burden of the aforementioned headache entities. The detailed history of each patient and the procedures applied regarding pain relief that comply with evidence-based treatment modalities were the assets of the estimates.

Patients and Methods

The study was conducted between 2010 June and 2013 January and was approved by the ethical committee of the Gülhane Haydarpaşa Training Hospital and conforms to ethical standards as described in the Declaration of Helsinki.

Data were collected prospectively where the study was designed as retrospective case control study.

136 outpatients who admitted with the complaint of headache were examined and 64 patients among them presenting with headache or cervical pain whose symptoms could not be attributed to any definite pathology, were enrolled in the study. The rest, with diagnosed intracranial pathologies including supratentorial and infratentorial tumors, hydrocephalus, cavum septum pellucidum, arachnoid cysts, Arnold Chiari malformation, intracranial hemorrhages, multiple sclerosis, cerebral atrophy, microvascular ischemic changes, and migraineurs on treatment were excluded. For 30 of 64 patients (group A) it was the first time that they were being evaluated for headache (Table I). Remaining 34 patients who were enrolled in the study were previously evaluated at various clinics because of their predominant headache with numerous tests and imaging studies (group B) (Table II). Histories of all of the patients were elaborated carefully to delineate the successive health care resource utilization. The tests and imaging studies, which were performed, and expected to discern pertinent pathology, were noted for the patients in group B. Next, the total number of similar tests (MRI, CT, radiographs), which apparently did not have pivotal role in the diagnosis, was outlined and their averages were calculated. Number of hospital visits and absenteeism and their averages were also taken.

Likewise, in order to establish a proper diagnosis, individuals with undiagnosed headache (group A) were asked to answer questions about their headache symptoms, and the responses were compared with the revised diagnostic criteria of CHA and ON according to the International Headache Society (IHS)'s recent International Classification of Headache Disorders (8, 12, 29) (Table III). Cranial CT scans, plain cervical radiographs, and cervical MR studies of the patients were obtained as needed and were examined carefully to rule out any intracranial pathology and major cervical spinal disorders and averages for the number of tests, hospital visits, and absenteeism were calculated in the same fashion. After completing history taking and physical examination, greater occipital nerve (GON) blockade was planned and informed consent of each patient was obtained. Then, 'methylprednisolone acetate' and 'bupivacaine' mixture was injected in the area of the GON (4, 5, 7, 10, 12-16, 20, 21, 30-37). Relief of headache was questioned several minutes, an hour and three days after the injection. In the late follow-up, visual analog scale was used to measure the pain relief at the end of third week, third month, and sixth month (38-41) (Fig 1). Response to treatment is the matter of another study.

Raw data were analyzed using SPSS statistics packet program version 20.0 for Mac. Number, percentage (%), median, minimum value, maximum value, mean, and standard deviation (sd) were used to define data. Normality of the variables was evaluated by the Kolmogorov Smirnov test. Chi square test was used for intergroup comparisons for categorical variables. Either t-test or Mann-Whitney-U test were used to evaluate the continuous variables. P-values less than 0.05 were considered statistically significant ($p < 0.05$).

Results

Mean age of the patients in the groups A and B were 39.4 (ranging from 18-65 years), and 34.7 (18-58 years) years, respectively. In group A, an average of 0.5±0.5 (min 0; max 1, median 0.5) MR imaging studies, 1.0±0.3 (min 0; max 2, median 1) CT scans, and 1.1± 0.3 (min 1; max 2, median 1) plain radiographs were obtained for each patient. Each of the patients in group A paid 3.1±0.8 (min 2; max 5, median 3) hospital visits and they were off work approximately for 5.6 days (sd 1.8, min 3; max 10, median 5 days). In group B, average number of MRI studies and CT scans were 2.9±1.5 (min 0; max 6, median 2.5) and 2.8±1.4 (min 0; max 8, median 3), respectively. They had 3.3±1.6 (min 2; max 8, median 3) radiographs. Each patient in group B paid an average of 16.2±9.6 (min 4; max 50, median 13.5) hospital visits and their mean absenteeism was 33.4±21.3 days (min 10; max 90, median 24.5 days) (Table IV). The data obtained from the study revealed that the application of GON block both as diagnostic and therapeutic intervention provided a significant decrease in the number of tests and consequently cost of diagnosis and treatment. Furthermore, hospital visits and number of days off work were remarkably lower than that of group B.

Discussion

Headache is a very common complaint that affects the majority of the population at some time in their lives. There are various pathologic bases for headache symptoms, and they are diverse, and often it is a challenge for the physician in distinguishing subtypes. Classification is principally based on the evaluation of the symptoms and is followed by clinical testing as needed (14). A list of 14 different headache types have been documented and defined by the IHS (4, 5, 7, 10, 12-16, 34-37).

Since different pathological basis is attributed to each form of headache, an incorrect differential diagnosis will often not only lead to treatment failure, but it will also burden patients and society with the cost of numerous clinical tests and further workday loss. It should also be noted that different forms of headaches could co-exist(10, 11, 42). The most common form of headache is tension type headache with a global prevalence of 38%, followed by migraine and chronic daily headache with a reported prevalence of 10%, and 3%, respectively(24). The crucial point is that, though the prevalence of CHA and ON is considerably lower than other types, afflicted patients have a substantial loss of quality of life, comparable to patients with migraine and tension-type headache. Pathophysiological mechanisms of the headache types however are not well established.

CHA and ON both refer to specific types of unilateral headache thought to arise from impingement or injury of the occipital and\or upper cervical nerve roots. The two main groupings of patients with CHA and ON include those with structural pathology and those with no apparent etiology. Known causes of neuralgic pains in this area include trauma to the greater or lesser occipital nerves, compression of these nerves or the up-

Table I. Demographical data and the clinical course of the patients in Group A.

No	Gender & Age	Duration of pain	Diagnostic tools applied	Previous diagnosis & treatment	Number of hospital visits\ absenteeism	VAS	Pain-free period
1	F\38	1 yr.	Cervical spinal MR, Cervical radiograph, Cranial CT	N\A	3\5	4\10	3 mo
2	F\42	6 mo.	Cervical radiograph (C4-5 angulation), Cranial CT	N\A	4\6	0\10	6 mo
3	F\32	16 mo.	Cervical spinal MRI, Cervical radiograph, Cranial CT.	Depression, (antidepressant medication)	3\5	3\10	1.5 mo
4	M\31	5 mo.	Cervical radiograph	N\A	2\3	4\10	2 mo
5	F\58	10 mo.	Cervical spinal MRI, Cervical radiograph, Cranial CT	Cerebral ischemic microvasculary changes	3\5	2\10	3 mo
6	F\30	8 mo.	Cervical spinal MRI, Cervical radiograph, Cranial CT	N\A	3\6	3\10	1 mo
7	F\35	5-6 mo.	Cervical spinal MRI, Cervical radiograph, Cranial CT	Migraine	2\4	0\10	1 mo.
8	F\34	10-12 mo.	Cervical spinal MRI, Cervical radiograph, Cranial CT	N\A	3\5	8\10	3 mo
9	F\45	3 yrs.	Cervical radiograph, Cranial CT	Trigeminal Neuralgia	2\4	3\10	2 mo
10	F\30	8 mo.	Cervical spinal MRI, Cervical radiograph (oblique), Cranial CT	N\A	3\6	0\10	6 mo
11	F\26	12 mo.	Cervical radiograph, Cranial CT	N\A	3\5	1\10	2 mo
12	F\33	8-10 mo.	Cervical radiograph (oblique) Cranial CT	N\A	2\3	0\10	3 mo
13	M\48	2 yrs.	Cervical spinal MR, Cervical radiograph, Cranial CT	Parkinson`s disease	2\5	2\10	1.5 mo
14	F\19	6 mo.	Cervical radiograph, Cranial CT	N\A	3\4	2\10	3 mo
15	M\24	4-6 mo.	Cervical radiograph, Cranial CT	N\A	2\7	3\10	1.5 mo
16	F\20	10-12 mo.	Cervical radiograph, Cranial CT	Sinusitis	3\3	0\10	3 mo
17	M\50	6 mo.	Cervical radiograph, Cranial CT	Non specific analgesic treatment	3\7	2\10	4 mo
18	F\38	6 mo.	Cervical radiograph, Cranial CT	N\A	4\6	2\10	2 mo
19	F\37	8-10 mo.	Cervical radiograph, Cranial CT	N\A	3\5	4\10	3 mo
20	F\51	10 mo.	Cervical radiograph, Cranial CT, Cervical spinal MRI	Non specific analgesic treatment	3\6	0\10	5 mo
21	F\35	8-10 mo.	Cervical radiograph, Cranial CT	N\A	4\5	0\10	2 mo
22	F\41	7-8 yrs	Cervical spinal MRI, Cervical radiograph, Cranial CT	Non specific analgesic treatment	3\10	1\10	1 mo
23	M\22	1-2 yrs.	Cervical spinal MRI, Cervical radiograph, Cranial CT	N\A	4\6	6\10	1 mo
24	F\28	6-8 mo.	Cervical radiograph (oblique), Cranial CT, EMG	Non specific analgesic treatment	4\6	0\10	2 mo
25	F\ 34	1 yr	Cervical spinal MRI, Cervical radiograph, Cranial CT	Sinusitis	3\6	2\10	3 mo
26	F\30	1 yr	Cervical radiograph, Cranial CT	N\A	3\4	1\10	2 mo
27	M\42	9 mo	Cervical radiograph, Cranial CT	N\A	4\10	0\10	1.5 mo
28	F\18	3 mo	Cervical radiograph, Cranial CT, Paranasal sinus CT	Non specific medication	3\5	0\10	2 mo
29	M\38	2 yrs	Cervical spinal MRI, Cervical radiograph, Cranial CT	Physiotherapy and non specific medication	4\6	2\10	3 mo
30	F\33	1 yr	Cervical spinal MRI, Cervical radiograph, Cranial CT	Non specific medication	5\10	2\10	3 mo

Table II. Demographical data and the clinical course of the patients in Group B.

No	Gender & Age	Duration of pain	Diagnostic tools applied previously	Previous diagnosis & treatment	Number of hospital visits & absenteeism	VAS	Pain-free period
1	F\57	10 yrs	Cranial MRI, Thoracic spinal MRI, Cervical spinal MRI, Radiographs (5)	Spondylosis, Non specific headache (medication)	20 times 45 days	3\10	4 mo
2	M\23	6 mo	Cranial MRI, Cervical and Cranial CT, Radiographs, Electroencephalography (EEG), Thyroid function tests,	Loss of Cervical lordosis (medication and physiotherapy)	14 times 34 days	2\10	2 mo
3	F\38	7 mo	Cervical MRI, Radiographs, Cranial MRI, Cranial CT (2)	Cervical spondylosis, Fibromyalgia (acupuncture therapy, physiotherapy, medication)	16 times 30 days	0\10	12 mo
4	F\34	12 mo	Cranial MRI, Cervical MRI (2), radiographs, Cranial CT, Paranasal sinus CT	Cervical discopathy, stress headache (Physiotherapy, medication)	8 times 26 days	0\10	6 mo
5	F\40	18 mo	Cervical MRI, Cranial MRI (2), Radiographs, Temporal bone CT, Cranial CT, Paranasal sinus CT	Sinusitis, cervical disc disease, depression (medication, physiotherapy)	13 times >30 days	1\10	4 mo
6	F\47	7 yrs.	Cranial MRI (3), Cervical MRI (2), Cranial CT (3), Cervical spinal CT, Radiographs (>7), EEG, Doppler USG,	Vascular type headache, sinusitis, major depression, chronic neuropathic pain disorder, Cervical spondylosis (medication, physiotherapy)	>30 times >60 days	4\10	1 mo
7	F\55	2 yrs	Cranial MRI (2), Cervical MRI, Cervical spinal CT, radiographs, Carotid artery Doppler USG	Cerebral ischemic disease, cervical spondylosis,	10 times 18 days	0\10	3 mo
8	F\32	3yrs	Cranial MRI (2), Cervical MRI (2), Cervical spinal CT, Cranial CT, radiographs	Cervical spondylosis, Stress headache, (medication, physiotherapy)	12 times 18 days	2\10	6 mo
9	F\40	9-10 yrs	Cranial MRI, Thoracic spinal MRI, Cervical spinal MRI, radiographs	Cervical disc herniation (C6-7), loss of lordosis, History of head trauma	15-20 times 40-45 days	4\10	4 mo
10	M\24	1 yr	Cranial CT, Cervical spinal CT, Cranial MRI, Radiographs, EEG	Sinusitis, cervical disc disease, depression, arachnoid cyst (medication, physiotherapy)	14 times 20 days	2\10	3 mo
11	M\55	3 yrs	Cranial MR (2), Cervical MRI (1), Cervical spinal CT, Cranial CT (3), radiographs, Doppler USG	Cervical spondylosis, depression, cerebral periventricular ischemic changes	>20 times >45 days	0\10	3 mo
12	M\38	4 yrs	Cranial MRI (3), Cervical MRI (2), Cranial CT (3), radiographs	Depression, cavum septum pellucidum (Medication)	>30 times 60 days	1\10	2 mo
13	F\43	10 yrs	Cranial MRI (3), Cervical MRI (3), Cervical spinal CT, Cranial CT (4), radiographs, EEG, Paranasal sinus CT (3)	Cervical spondylosis, loss of lordosis, Fibromyalgia, Depression, Premenstrual syndrome, sinusitis (Medication and physiotherapy)	>50 times >90 days	0\10	1 mo
14	F\48	2 yrs	Cranial MR (1), Cervical MR (1), Cervical spinal CT, Cranial CT (2), radiographs	Loss of lordosis, stress headache, (Medication)	13 times 20 days	2\10	3 mo
15	F\33	1 yr	Cranial MR (1), Cervical MR (1), Cranial CT (2), radiographs	Stress headache, sinusitis (Medication and physiotherapy	7 times 18 days	0\10	2 mo
16	F\23	6 mo	Cranial MRI (1), Cranial CT, radiographs, EEG, Doppler USG	Myalgia (medication)	4 times 10 days	0\10	3 mo
17	M\21	1 yr	Cranial MRI (1), Cervical MRI (1), Cervical spinal CT, Cranial CT (2), Radiographs	Loss of lordosis (medication and physiotherapy)	6 times 10 days	4\10	2 mo
18	F\35	6 yrs	Cranial MRI (2), Cervical MRI (2), Cranial CT (3), Radiographs	Depression, premenstrual syndrome, fibromyalgia (medication and physiotherapy)	>30 times >90days	1\10	3 mo

19	F\60	10 yrs	Cranial MRI (3), Cervical MRI (2), Cervical spinal CT, Cranial CT (3), Radiographs	Cerebral atrophy, Cervical spondylosis (Medication, physiotherapy)	>30 times >60 days	2\10	6 mo
20	F\34	1 yr	Cranial MRI, Cervical MRI, Cranial CT, Radiographs, EEG, Paranasal sinus CT	Depression (Medication)	11 times 18 days	1\10	3 mo
21	M\44	9 mo	Cranial MRI, Cranial CT (2), Cervical MRI, Radiographs	Stress headache (medication)	6 times 16 days	0\10	3 mo
22	F\18	6 mo	Cranial MRI, Cervical MRI, Cervical spinal CT, Cranial CT, Radiographs	Loss of cervical lordosis, stress headache, depression (medication)	9 times 20 days	1\10	6 mo
23	F\33	1 yr	Cranial MRI (2), Cervical MRI, Cranial CT, Radiographs	Cervical disc herniation (medication, physiotherapy	13 times 20 days	0\10	3 mo
24	M\40	1 yr	Cranial MRI, Cervical MRI, Cervical spinal CT, Cranial CT (2), Radiographs, CT angiography	Cervical spondylosis, cervical hydromyelia	15 times 20 days	2\10	3 mo
25	F\27	9 mo	Cranial MRI, Cervical MRI, Cranial CT (2), Radiographs	Depression, sinusitis	7 times 10 days	1\10	1.5 mo
26	F\50	4 yrs	Cranial MR (2), Cervical MR (3), Cervical spinal CT, Cranial CT (2), radiographs	Loss of lordosis, cervical degenerative disc disease (cervical discectomy and anterior fusion)	13 times >30 days	3\10	3 mo
27	M\57	10 yrs	Cranial MRI, Cervical MRI (2), Cervical spinal CT, Cranial CT (2), Radiographs, EEG	Cervical disc disease, sinusitis, migraine (medication)	>20 times >60 days	0\10	6 mo
28	F\34	18 mo	Cranial MRI, Cervical MRI, Cervical spinal CT, Cranial CT (3), Radiographs	Loss of lordosis, premenstrual syndrome (medication)	>10 times >20 days	0\10	3 mo
29	F\45	12 mo	Cranial MRI (2), Cervical MRI, Cervical spinal CT, Cranial CT (2), Radiographs	Cervical spondylosis, degenerative disc disease	11 times >21 days	2\10	6 mo
30	M\22	6 mo	Cranial MRI, Cervical MRI, Cervical spinal CT, Cranial CT, Radiographs	Anxiety, depression, loss of lordosis	15 times 30 days	3\10	3 mo
31	F\ 26	12 mo	Cranial MRI, Cervical MRI, Cervical spinal CT, Cranial CT, EEG, Radiographs	Sinusitis, premenstrual syndrom	>10 times 20 days	0\10	1.5 mo
32	F\65	>10 yrs	Cranial MRI (3), Cervical MRI (2), Cervical spinal CT, Cranial CT (4), Radiographs, Doppler USG, MR angiography	Cervical spondylosis, cerebral atrophy, ischemic gliotic changes	>30 times >60 days	0\10	6 mo
33	M\61	4 yrs	Cranial MRI (2), Cervical MRI (2), Cervical spinal CT, Cranial CT (3), Radiographs, Doppler USG, MR angiography	Cervical degenerative disc disease, hypertension (medication)	>20 times >40 days	2\10	3 mo
34	F\39	2 yrs	Cranial MRI (2), Cervical MRI (1), Cranial CT (3), Radiographs.	Arachnoid cyst, depression (medication)	14 times 23 days	3\10	2 mo

Table III. According to the International Headache Society's most recent International Classification of Headache Disorders (2004) the diagnostic criteria of CHA are as follows (Göbel et al. 2004):

A. Pain referred from a source in the neck and perceived in one or more regions of the head and/or face fulfilling criteria C and D.

B. Clinical, laboratory and/or imaging evidence of a disorder or lesion within the cervical spine or soft tissues of the neck known to be, or generally accepted as, a valid cause of headache.

C. Evidence that the pain can be attributed to the neck disorder or lesion based on at least one of the following:

1. Demonstration of clinical signs that implicate a source of pain in the neck.

2. Abolition of headache following diagnostic blockade of a cervical structure or its nerve supply using placebo- or other adequate controls

D. Pain resolves within 3 months after successful treatment of the causative disorder or lesion.

Table IV . The average number of the relevant studies, hospital visits, and absenteeism are given in the table.

Groups	MRI (Cranial, cervical, angiography)	CT (Cranial, cervical, angiography paranasal)	Radiographs	Hospital visits	Absenteeism (Days)
Group A (n=30)	0.5±0.5 (min 0; max 1, median 0.5)	1.0±0.3 (min 0; max 2, median 1)	1.1± 0.3 (min 1; max 2, median 1)	3.1±0.8 (min 2; max 5, median 3)	5.6 days (sd 1.8, min 3; max 10, median 5 days)
Group B (n=34)	2.9±1.5 (min 0 ; max 6, median 2.5)	2.8±1.4 (min 0; max 8, median 3)	3.3±1.6 (min 2; max 8, median 3) radiographs	16.2±9.6 (min 4; max 50, median 13.5)	33.4±21.3 days (min 10; max 90, median 24.5 days)
(P<0.05)	P<0.001	P<0.001	P<0.001	P<0.001	P<0.001

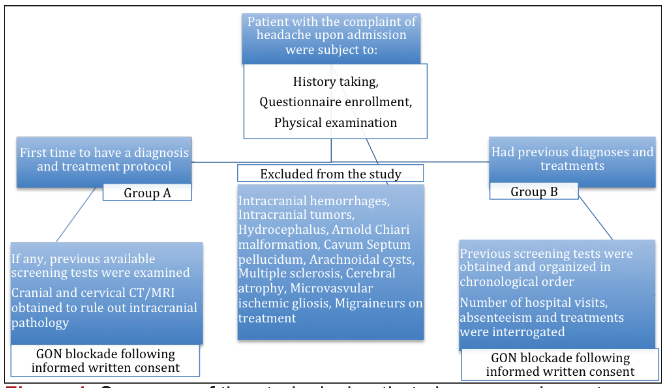

Figure 1. Summary of the study design that gives precedence to GON blockade in diagnosing and treating CHA with fewer burdens to patients and community.

Visual analog scale was used to measure pain relief. Satisfactory pain relief was recorded in both groups. Working diagnosis of headache was put according to International Headache Society's recent International Classification of Headache Disorders. Least amount of health resources were used and least amount of workday loss and economic burden were caused.

per cervical roots by arthritic changes in the spine, and tumors involving the second and third cervical dorsal roots (2-5, 43, 44). They are generally felt to be responsible for the symptoms including unilateral and occasionally bilateral head, neck, and rarely arm pain. Most patients with occipital neuropathy do not have discernible lesions.

CHA is a subtype of known headache syndromes characterized by chronic hemicranial pain that is emanated from the soft tissues and bony structures of upper neck (5, 6, 8, 12, 34, 36, 45). Likewise, ON is characterized by pain in the suboccipital region and in the back of the head (22, 33, 46, 47). There are no neurological findings of cervical radiculopathy. Patients will often have altered neck posture or restricted cervical range of motion. The head pain can be reproduced by active neck movement, or on applying digital pressure to the involved facet regions and over the ipsilateral greater and\or lesser occipital nerve(s). Both physical and emotional tension is common precipitating factors. The classic description of occipital neuralgia includes the presence of constant deep or burning pain with superimposed paroxysmal shooting pain. Paresthesia and numbness over the occipital scalp are usually present. The pain of occipital neuralgia is believed to arise either from entrapment of the occipital nerve within the neck or scalp, or from the C2 spinal root, C1–2, or C2–3 zygapophyseal joints. Muscular trigger points are usually found in the suboccipital, cervical, and shoulder musculature (19, 29, 44, 48, 49). Pressure over the occipital nerves can lead to an exacerbation in pain, and it can refer to the head when manually stimulated. The pain starts in the suboccipital region and radiates over the posterior scalp and sometimes across the lateral scalp. It is believed that the sensory nerve fibers from the descending fibers of the trigeminocervical tract interact with the sensory nerve fibers from the upper cervical roots (46, 47). Pain is spread and reflected in bidirectional fashion in the face and head via this functional interaction between upper cervical and trigeminal pain sensations between the neck and trigeminal sensory receptive fields (3-9, 12, 13, 16, 18-21, 29-32, 34, 36, 42, 47, 50-52).

Diagnosis is essentially based on the symptoms and the clinical physical examination findings (3, 8-10, 12, 13, 34, 35, 50). The region of the pain clearly establishes the diagnosis; the difficult task is determining whether the nerve lesion is primary or secondary. Vascular pains (migraine or cluster headaches) are usually characterized by discrete attacks of throbbing pain, often associated with nausea and vomiting. Migraine is often terminated by ergot alkaloids or sumatriptan; neuralgic pains are not. Migraine with aura has distinctive symptoms such as flickering lights, spots in the field of vision, numbness or pins all of which usually tend to be fully reversible and last less than an hour (1, 11, 23, 26, 53). Pain that is unilaterally located, pulsatile, moderate or severe, lasting a fixed period of time usually not longer than 72 hours, aggravated by certain routine physical activities and accompanying nausea, photophobia, or phonophobia are distinctive features of migraine without aura (14, 53). Chronic tension type headaches are a variant of myofascial pain syndrome. They are assumed to be stress related. The patient usually has a long history of such headache. A pain, that is mild or moderately intense, lasting from half an hour to seven days, characterizes it. This type of headache is bilateral, not aggravated by physical activity, and is not associated with nausea, vomiting, photophobia, or phonophobia (1, 7, 11, 14, 20, 53, 54).

Characteristics of CHA according to the Cervicogenic Headache International Study Group that has further been modified by Göbel are shown in Table III. Unfortunately, a number of headache characteristics are shared between the common headache forms and CHA (8, 10-12, 35, 42).

Despite the application of aforementioned diagnostic criteria, studies have shown that still incorrect headache diagnosis can occur in not an inconsiderable number of the cases because these entities have many traits in common, so many that they may be misconstrued and mixed up (10, 11, 34-36, 42, 55). Positive findings from neurologic examination lead to the suspicion of structural life threatening pathologies such as intracranial tumors, meningitis, parenchymal central nervous system infections, progression of congenital structural malformations, hydrocephalus, arteritis, subarachnoid hemorrhage, arterial dissections. Basically, a CT scan can elucidate the problem and such situations seldom necessitate further radiological studies in order to rule out irrelevant pathologies. Currently, an MRI study of the posterior fossa and upper cervical spine is the best way to rule out occult pathology in this anatomic region. Imaging studies cannot confirm the diagnosis of CHA and ON alone, but can nevertheless lend support to its diagnosis (45, 50). However, these patients are confronted with a gamut of extraneous radiological and clinical testing. Therefore, one should have to do his utmost to determine which tests have been more than enough and that better not have been performed.

Patients with a diagnosed CHA or ON are usually initially subject to pharmacological treatment, physiotherapy, or transcutaneous electrical nerve stimulations, which can often provide no or modest benefit(8, 50). Anesthetic blockade of the greater and lesser occipital nerves by injections among the applicable invasive treatment methods can provide temporary but substantial pain relief (8, 29, 31, 50). Furthermore, Ashkenazi (2010) and Levin (2010) reported beneficial effects produced by blockade of greater and\or lesser occipital nerves in most headache syndromes especially, CHA and ON (30, 31). Some other authors observed that GON block has also been successful in other headache types in varying degrees, where it was found out almost ineffective in the treatment of chronic tension type headache and a reduced response was correlated with medication overuse (22, 30, 31, 56, 57). Inan suggested that repeated GON blockade with the administration of long-acting local anesthetic and depot-steroid preparations, provided efficacy similar to repeated blockade of the C2 and C3 nerves (8, 29). This proposal brings to mind the application of GON blockade as a reasonable, inexpensive and instructive option in the treatment of CHA and ON before switching to more invasive or expensive treatment alternatives. If the impact of the burden on the patients with undiagnosed headache and its consequential effects on health resource use is considered, it sounds quite fair to advocate GON blocks as a diagnostic test for CHA and ON.

From the aforementioned facts reported about the effectiveness of nerve blockade in the management of certain headache syndromes, we inferred that GON blockade could be a promising diagnostic tool. Its proper application is expected to provide a more accurate diagnosis in a rather more cost-effective fashion. Therefore, our study was designed to show the profits of giving priority to nerve blockade in diagnosing and treating CHA and ON. The application of GON block both as diagnostic and therapeutic intervention provided a working diagnosis of CHA and ON. Remarkable accuracy of the diagnosis and admirable pain relief at follow-up accentuated the use of GON blocks to the benefit of patients. The present study, additionally discerned that inadvertent approaches to patients who need to be cautiously evaluated for differential diagnosis incurred extraneous consumption of health resources and impacted on workplace productivity. The climax of the study is the reduced record of need for diagnostic tests. Radiologic imaging studies, electromyography, analgesic consumption, hospital visits, and absenteeism accordingly decreased to acceptable quantities in the group of patients who experienced nerve blockade as overriding tool in the diagnostic algorithm. Physicians from different disciplines evaluated the patients and referred them to our clinic for diagnostic nerve blockade. Injections were applied by the same neurosurgeon. A sum of 64 patients, suspected to have either CHA and ON but do not carry a previously established definitive diagnosis, underwent nerve blockade. Extermination of their headache confirmed the diagnosis of CHA and\or ON. Only cervical plain radiographs and cranial CT scans of these patients were obtained to rule out potentially life threatening pathologies prior to implementation of occipital nerve block. Upon the suspicion of radiculopathy or spondylosis, cervical spinal MRI studies were also held for these patients to rule out coincidence of cervical spondylosis or disc disease at lower cervical segments.

After nerve blockade, patients did not have to consume analgesics for a commendable period of time, and relief of pain was attained with lower doses at repeat blockades, thereafter.

Conclusions

The fundamental premise of the report mainly focuses on the predilection for occipital nerve blockade as an overriding tool in the diagnostic management strategies for CHA and ON. The comprehensive assessment of its propriety, contributions to diagnostic accuracy, clinical effectiveness, and cost-effectiveness can justify the assumption that precedence of GON blockade in the diagnostic process and treatment modality would provide expeditious management and prevent economic and social burdens to some extent. A thorough evaluation and selection of the most appropriate patients is, as is always, a matter of the utmost importance.

Declaration of conflicting interests

The Authors declare that there is no conflict of interest.

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