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## Practice guidelines

# French Guidelines For the Emergency Management of Headaches



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## 1. Preamble

### 1.1. Requesting body

These guidelines were elaborated at the request of the French society for the study of migraine and headache disorders (SFEMC<sup>1</sup>) and the French Society of Neurology (SFN<sup>2</sup>).

### 1.2. Topic

These guidelines concern recommended management practices for patients with headache disorders seen in an emergency setting. Four clinical aspects are distinguished: key elements of history taking and the physical examination, diagnostic and therapeutic strategies.

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<sup>1</sup> SFEMC Société Française d'Etude des Migraines et des Céphalées.

<sup>2</sup> SFN Société Française de Neurologie.

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These guidelines do not concern the management of patients with headache disorders seen outside the emergency setting. Specific recommendations are available for migraine, chronic daily headache, or cluster headache.

### 1.3. Patients concerned

These guidelines concern adult patients.

### 1.4. Professionals concerned

These guidelines are written for healthcare professionals involved in the management of patients with headache disorders seen in the emergency setting.

### 1.5. Guideline grade and methodology

These guidelines propose grade A, B or C recommendations according to the following modalities:

- Grade A recommendations are based on scientific evidence with a high level of proof, e.g. high-power randomized comparative trials without major bias and/or meta-analyses of randomized comparative trials, decision analysis based on well-conducted studies;
- Grade B recommendations are based on scientific conjecture issuing from intermediary level-of-proof studies, e.g. intermediate-power randomized comparative trials, well-conducted non-randomized comparative trials, cohort studies;
- Grade C recommendations are based on studies with a low level-of-proof studies, e.g. case-control studies, series of cases

Unless specified, the proposed guidelines are based on professional agreement among the members of the working group.

The lack of a level of proof does not imply that the proposed guidelines are not pertinent and useful. The lack of proof should incite the development of complementary studies when possible.

These guidelines were elaborated by the SFEMC and the SFN, in application of the methodology for the elaboration of good clinical practices (GCP). The pilot group was composed of six members: Anne Donnet (neurologist), Anne Revol (neurologist), Pierrick Giraud (Neurologist), Dominique Valade (emergency headache specialist), Pierre Michelet (intensivist), Philippe Cornet (general practitioner). The working group was composed of nine members: Xavier Moisset (neurologist), Jérôme Mawet (neurologist), Evelyne Guegan-Massardier (neurologist), Eric Bozzolo (neurologist), Vianney Gilard (neurosurgeon), Eléonore Tollard (neuroradiologist), Thierry Feraud (intensivist), Bénédicte Noëlle (neurologist) and Claire Rondet (general practitioner). It was headed by Anne Donnet. Xavier Moisset wrote the guidelines.

A reading group composed of members of the SFEMC and the SFN as well as independent healthcare professionals from these societies (general practitioners, intensivists, neuroradiologists) was consulted.

## 2. Introduction

Headache during the last three months is observed in approximately 15% of the general population [1]. Consequently, about 1% of patients seeking ambulatory care do so for headache [2], and 2% of patients attending an emergency room do so for headache [3,4]. Despite the fact that 95% of these patients return home with a diagnosis of benign primary headache, the attending physician must be able to detect secondary and potentially dangerous headache that requires referral [3,4].

Headache disorders are defined according to the criteria proposed in the 3rd version of the International Classification of Headache Disorders [5].

The present guidelines concern all types of headache disorders, whether primary or secondary, occurring as an isolated symptom leading an adult patient to seek emergency medical care (call to primary care physician, emergency squad or emergency room). There are different reasons for which patients seek emergency care for headache disorders:

- sudden-onset headache;
- first-occurrence headache or unusual headache not corresponding to prior experience;
- headache unresponsive to usual treatment;
- chronic headache no longer tolerated.

As a preamble, we recall that headache intensity and severity are not correlated. In the majority of cases—even for patients seen in an emergency setting—headache is a primary disorder. Primary headache can be highly disabling but does not in itself constitute a functional or vital risk. What is important is to identify secondary headache in order to institute adapted—sometimes emergency—treatment.

**Until evidence to the contrary, sudden-onset and/or unusual headaches should be considered as secondary disorders warranting emergency complementary exploration.**

Headache that the patient recognizes as usual, but with greater intensity and unresponsive to usual pain relievers, is generally a primary headache refractory to habitual treatment. In this situation, complementary exploration is not useful and—under the condition that the physical examination, notably the neurological examination, is normal—management should focus on achieving pain relief.

## 3. How can the four clinical presentations—recent onset-headache, recent progressive headache, recurrent paroxysmal headache, and chronic daily headache—be distinguished?

In daily practice, patients seek emergency care for four main types of headache disorders (Fig. 1):

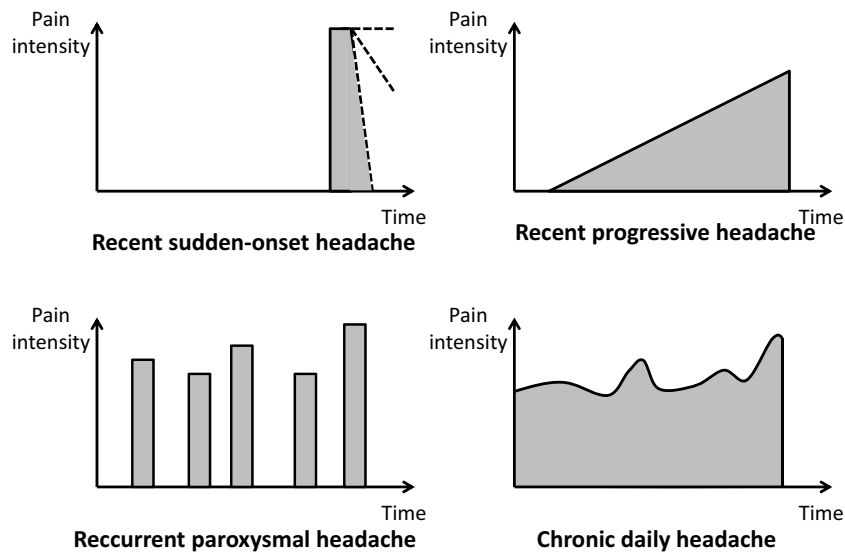


Fig. 1 – Schematic representation of the four clinical presentations.

- recent sudden-onset headache;
- recent progressive headache;
- recurrent paroxysmal headache;
- chronic daily headache.

Different etiologies are grouped together in each of these four clinical presentations. These categories are nevertheless useful for guiding the search for the main causes of the patient's symptoms. The diagnostic approach will be rapidly defined by history taking, from the patient or accompanying persons. It is important to differentiate the characteristic features of the headache for which the patient seeks emergency care from headaches the patient has experienced in the past.

#### 4. What are the key elements to search for in the patient's history?

In addition to the usual questions designed to recall the patient's past medical history and treatments, a small number of questions will provide a rapid first-line evaluation of the potential gravity of the patient's headache. This minimal check-list should be used for emergency room triage (or for telephone or face-to-face interrogation by the primary care physician or intensivist) (**Professional agreement**).

- When did the pain start? (**recent disorder**)
- How long did it take for the pain to reach peak intensity? (**sudden-onset disorder**)
- Have you already had this kind of pain? (**unusual disorder**)
- What were you doing when the pain started? (exercise...)
- Are there other symptoms: fever, photo- or phonophobia, vomiting, neck pain, focal neurological deficit, slow psycho-motor response, girdle pain?

- Is there a particular context: new medication, toxic substances, exposure to carbon monoxide; trauma; pregnancy or post-partum, cancer, systemic disease (including HIV); maneuver with dural injury or risk of injury within the preceding month (lumbar puncture, peridural analgesia, spinal nerve injections)...?
- Does body position affect the pain (relief or worsening in the supine position)?

#### 5. How should the physical examination be conducted?

If an attending physician is present, a systematic search should be conducted to identify (**Professional agreement**):

- impaired vigilance;
- fever;
- hypertension;
- meningeal syndrome;
- focal neurological deficit (motor or sensorial deficit, diplopia, pupil anomaly, cerebellar syndrome);
- disorders affecting the eyes, sinuses, ears or the oral cavity that could explain the headache.

#### 6. What first-line measures are required?

If secondary headache warranting emergency treatment is suspected, the patient should be referred to the nearest emergency ward in order to undergo complementary exploration (brain imaging, cerebrospinal fluid [CSF] analysis, blood tests). Ideally, the patient should be referred to a hospital with a neurology unit (**Professional agreement**).

Thus, EMERGENCY CARE is recommended for all patients presenting:

- sudden-onset or thunderclap headache (peak intensity within one minute);
- recent-onset or recently worsening (< 7 days) unusual headache;
- headache associated with fever (without other obvious general cause of fever such as a flu-like syndrome in an outbreak context);
- headache associated with neurological signs;
- headache suggestive of intoxication (particularly CO);
- headache in a context of immune deficiency.

In the case of telephone contact, the patient should be advised to seek medical assistance rapidly (primary care or on-call physician) in the following situations:

- the patient is familiar with this type of headache but it is unresponsive to usual pain relievers;
- the headache is semi-recent (8 days to 6 months) with no sign of worsening in the last few days;
- longstanding headache (> 6 months) with an intensity or frequency the patient cannot cope with.

History taking should also identify the underlying pattern of the headache: “Do you have headaches daily, permanently, or by acute attacks?”

If the patient reports acute attacks, a precise description (duration, localization, intensity, associated signs, triggering factors, number of headache days per month, treatments tried and their efficacy) will help determine the type of headache. A given individual may present several types of primary headache (for instance, migraine without aura and tension-type headache).

If the patient has chronic daily headache, the reported description will guide the diagnosis. Nevertheless, any recent change in the presentation of a primary headache is suggestive of a secondary headache, to be ruled out or not. Moreover, it is important to search for overuse of pain relievers (medication overuse). In all cases, chronic daily headache existing for less than six months should be explored (Professional agreement) [6].

In patients reporting primary headache, complementary explorations are not useful if the attacks are well known and longstanding, fulfilling all the diagnostic criteria [5].

Outside acute episodes, the general and neurological examination is normal in patients with primary headache (excepting the Claude-Bernard Horner sign that is sometimes observed between attacks in a context of cluster headache).

## 7. What are the specific clinical features of the main primary headache disorders?

### 7.1. Migraine, tension-type headache and cluster headache

The clinical criteria are described in the ICHD-3 [5]. The main elements are summarized in Table 1. For patients presenting a first cluster headache, brain magnetic resonance imaging (MRI), and MRI or computed tomography (CT) angiography of the head and neck should be performed (Professional agreement) [7].

### 7.2. Status migrainosus

In patients with a known migraine, status migrainosus corresponds to a persistent disabling attack lasting more than 72 h. Periods of relief lasting less than 12 h (following medication or during sleep) can occur. This is a rare entity [8]. Secondary headache must be ruled out before establishing the diagnosis.

### 7.3. Chronic daily headache

Chronic daily headache occurs in patients who previously had an underlying primary headache [6]. These headaches can be secondary to medication overuse, defined as use at least 15 days per month for at least three months of non-opioid pain relievers (acetaminophen, aspirin, non-steroidal anti-inflammatory drugs [NSAID]), or use 10 days per month of opioid, triptan-ergotamine pain relievers, and/or a combination of several medications [5].

## 8. Diagnostic and therapeutic management

### 8.1. Diagnostic management

#### 8.1.1. Sudden-onset headache

##### 8.1.1.1. Clinical signs.

Until evidence to the contrary, all patients complaining of headache who fulfill one criterion of the Ottawa clinical decision rule (Box 1) should be suspected of having subarachnoid hemorrhage (Perry et al., 2013) (Grade B).

Headache is the only clinical sign in one-third of patients with subarachnoid hemorrhage [9]. There are no supplementary clinical criteria providing evidence that complementary exploration can be postponed (Grade C) [10]. The Ottawa clinical decision rule can be applied for all cases of non-trauma headache not associated with neurological deficit, a past history of aneurysm, subarachnoid hemorrhage, brain tumor, or recurrent headache ( $\geq 3$  episodes in  $\geq 6$  months) [11,12].

**Table 1 – Main clinical features for the diagnosis of migraine, tension-type headache and cluster headache.**

|                         | Migraine                                  | Tension-type headache                                  | Cluster headache                       |
|-------------------------|---|--|--|
| Duration                | 4–72 h                                    | 30 min–7 days  | 15 min–3 h                             |
| Site                    | Generally unilateral                      | Bilateral  | Orbito-temporal unilateral             |
| Intensity               | Moderate to severe                        | Mild to moderate                                       | Very severe                            |
| Type                    | Often pulsating                           | Compression, band-like pressure                        | Boring, squeezing                      |
| Accompanying signs      | Nausea, vomiting, photo- and phono-phobia | No nausea or vomiting, Photo- or phono-phobia possible | Homolateral autonomic signs, agitation |
| Impact of exercise      | Aggravation                               | No change  | No change                              |
| Number of prior attacks | ≥ 5                                       | ≥ 10   | ≥ 5                                    |

**Box 1.**

The Ottawa clinical decision rule

Exploration to search for subarachnoid hemorrhage is warranted in all patients presenting at least one of the six criteria. This rule is for patients aged over 15 years who present with severe non-traumatic headache that reached peak intensity in less than one hour. It does not apply to cases with neurological deficit, history of aneurysm, subarachnoid hemorrhage, brain tumor, or recurrent headache (≥ 3 episodes in ≥ 6 months).

- 1- Age ≥ 40 years
- 2- Neck pain or stiffness
- 3- Witnessed loss of consciousness
- 4- Onset during exertion
- 5- Thunderclap headache (intensity > 7/10 in less than 1 min)
- 6- Limited neck flexion

The rule has an excellent negative predictive value, but poor specificity [11,12]. However, complementary emergency exploration may be warranted in certain cases of headache not meeting any of the Ottawa rule criteria.

#### 8.1.1.2. Complementary explorations.

A patient who presents with sudden-onset headache or headache associated with a neurological deficit should have an emergency CT scan (**Grade B**) (Edlow et al., 2008). Cerebral CT angiography should also be performed in all patients in order to explore the arterial and the venous networks (**Professional agreement**). MRI with MR angiography can be the first-line exploration if therapeutic management is not delayed (**Professional agreement**).

Positive diagnosis of subarachnoid hemorrhage is confirmed by the cerebral CT scan without contrast injection that has 98% sensitivity when performed within 12 h of symptom onset (sensitivity falls to 93% after 24 hr, 85% at 5 days and 50% at 7 days) (**Grade B**) [5,13,14]. Although a CT scan without contrast injection is indispensable, it is not sufficient. The Guide for good use of medical imaging explorations published by the French Society of Radiology and the French Society of Nuclear Medicine under the auspices of the French

health authorities (HAS<sup>3</sup>) and the Nuclear safety authorities (gbu.radiologie.fr) recommends that a cerebral CT angiography should also be performed in all cases if no bleeding is visualized spontaneously, in order to explore the arterial and venous networks (**Professional agreement**) [15,16]. MRI with MR angiography can be performed as the first-intention exploration if compatible with the patient's clinical status and if it does not delay therapeutic management (**Professional agreement**) [16].

If subarachnoid hemorrhage is suspected and the imaging results do not provide evidence for the diagnosis, a lumbar puncture should always be performed, even if the headache has subsided (**Grade B**) [13,14,17]. CSF xanthochromia is present in 100% of patients with aneurismal subarachnoid hemorrhage when the CSF is drawn between 12 hr and 14 days after symptom onset and submitted to spectrophotometric analysis [5,13,18,19]. Some laboratories rely on a simple visual inspection of the supernatant that has lower sensitivity and specificity, creating a non-negligible risk of false-positive, and most importantly false-negative, results (**Grade B**) [20–22]. If the CT angiogram and the lumbar puncture do not provide evidence for subarachnoid hemorrhage related to a vascular malformation, cerebral angiography is not useful (**Grade B**) [17,23,24]. Subarachnoid hemorrhage without vascular malformation may correspond to a reversible cerebral vasoconstriction syndrome (RCVS). Other explorations may be discussed on a case-by-case basis, particularly if the pain persists.

In patients with suspected subarachnoid hemorrhage, if the CT angiography (MRA ou MR angiography) does not provide evidence for the diagnosis, a lumbar puncture should always be performed, even if the headache has subsided (**Grade B**) (Edlow et al., 2008; Steiner et al., 2013; Stewart et al., 2014).

A lumbar puncture using an atraumatic 25-gauge needle is recommended in order to reduce the risk of post-lumbar puncture headache and limit further induced costs (**Grade B**) (Davis et al., 2014; Lavi et al., 2006; Strupp et al., 2001; Tung et al., 2012).

There are many non-traumatic etiologies of sudden-onset headache. The most common causes are listed in Table 2. Other causes can also produce the same clinical presentation: CSF hypotension, angina pectoris or intra-ventricular tumor.

<sup>3</sup> HAS Haute Autorité de Santé.

**Table 2 – The most common etiologies of sudden-onset headache.**

|  | Potentially associated clinical features   | Complementary explorations  |
|--|--|---|
| Subarachnoid hemorrhage  | Meningeal syndrome<br>Isolated third nerve palsy<br>Loss of consciousness  | Brain MRI + brain arterial angiogram sequences<br>Brain CT ± CT brain angiogram ± lumbar puncture<br>Arteriography  |
| Other intracranial bleeding  | Focal signs that can be discrete in certain localizations (cerebellum)   | Brain MRI ± brain CT ± brain CT angiogram   |
| Brain infarction   | Focal signs that can be discrete in certain localizations (cerebellum)   | Brain MRI + brain arterial angiogram sequences<br>Brain CT ± CT brain angiogram   |
| Reversible cerebral vasoconstriction syndrome (RCVS)   | Repeated episodes occurring spontaneously or induced by exercise, Valsalva maneuver, before or with orgasm. Possible focal signs or epilepsy | Brain MRI + brain arterial angiogram sequences<br>Brain CT ± CT brain angiogram ± lumbar puncture ± arteriography   |
| Cerebral venous thrombus   | Neurological deficit<br>Epileptic seizure<br>Focal signs, intracranial hypertension  | Brain MRI + brain arterial angiogram sequences<br>Brain CT ± CT venous angiogram  |
| Cervical arterial dissection   | Neck pain, Claude-Bernard-Horner sign, pulsating tinnitus  | Brain CT + CT angiogram of the superior aortic trunks (SAT), Ultrasound-Doppler of the SAT, Brain MRI + MRI angiogram of the head and neck<br>Lumbar puncture |
| Meningitis ± encephalitis  | Fever, meningeal syndrome, cranial nerve involvement   | Ocular fundus: papillary edema<br>Brain MRI   |
| Hypertensive encephalopathy and eclampsia, posterior reversible encephalopathy syndrome (PRES) | Headache followed by perturbed consciousness, focal deficit, seizures<br>High blood pressure, 240/120 mmHg (lower if eclampsia)              |   |
| Pituitary necrosis   | Vision disorders, oculomotor disorders   | Brain MRI   |
| Temporal arteritis   | (sudden-onset rare)<br>Age > 50 yr<br>Impaired general condition   | C-reactive protein: elevated<br>Temporal artery biopsy  |

### 8.1.1.3. Diagnostic strategy.

For patients with subarachnoid hemorrhage, investigations should be performed to search for the cause, preferably with CT or MR angiography **Professional agreement**. Arteriography may be discussed on a case-by-case basis.

If the clinical presentation is a thunderclap headache, especially when there is no vascular malformation, the etiological search should focus on an RCVS [25] (**Professional agreement**). RCVS was considered to be rare, but is probably underdiagnosed. Its exact incidence is not known, but in tertiary centers, RCVS has been diagnosed in 45% of patients presenting with thunderclap headache [26]. RCVS is attributed to transient reversible abnormal regulation of cerebral arterial tone, which triggers multifocal diffuse vasoconstriction and vasodilatation, favored by vasoactive substances such as cannabis, cocaine, ecstasy, amphetamines, LSD, antidepressants (serotonin or serotonin and noradrenalin reuptake inhibitors), nasal decongestants, triptans and ergotamine. Onset is sudden, typically with thunderclap headache, often triggered by sexual activity or Valsalva maneuvers. RCVS can be complicated or associated with hemorrhage, ischemia or cerebral artery dissection [27]. Diagnosis requires demonstration of typical arterial anomalies on the CT or MRI angiogram. The first imaging exploration may be normal if performed early during the first 4–5 days after symptom onset. Anomalies reach a maximum 2–3 weeks after the first symptoms.

Thunderclap headache can also be the inaugural sign of cervical artery dissection, cerebral venous thrombosis, or

pituitary apoplexy, with a normal physical examination, CT, and CSF. Other explorations must be proposed when the CT angiogram of the supra-aortic trunks and the CSF analysis are normal; exploration of the cervical vessels and a brain MRI are needed [28]. The delay for obtaining these explorations will be discussed with a specialist (neurologist, neurosurgeon, neuroradiologist) on a case-by-case basis.

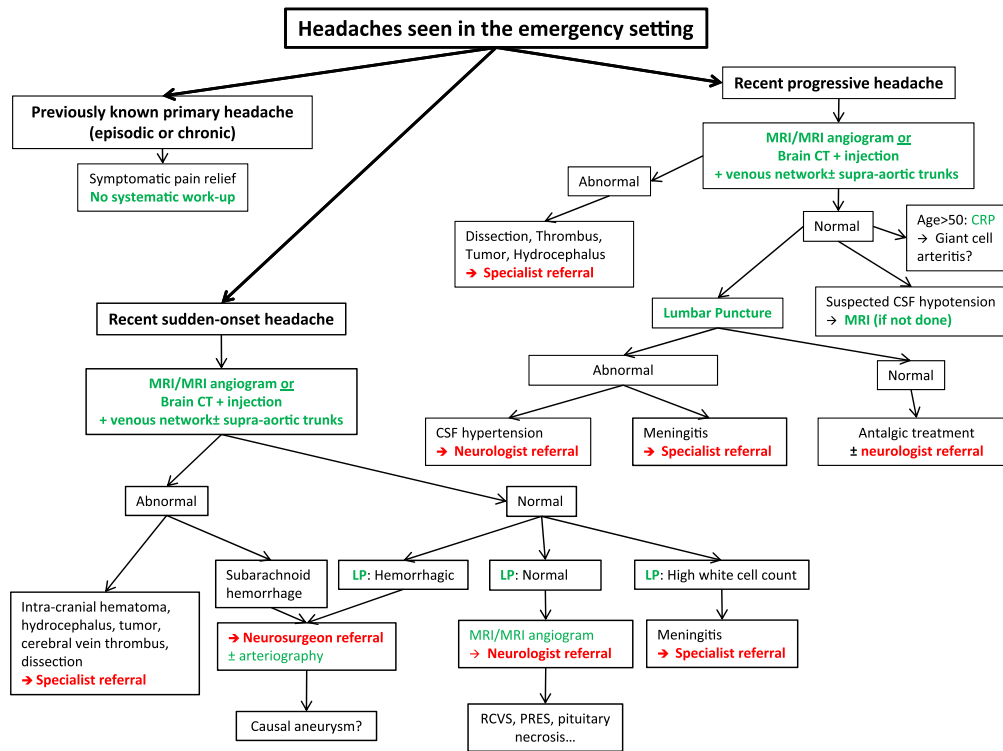
**If no diagnosis is established after the lumbar puncture, the initial imaging will be completed by imaging of the supra-aortic trunks. If an RCVS is suspected, the imaging will be repeated a few days later (MRI with MRI angiogram or, if not available, CT angiogram).**

### 8.1.2. Progressive unusual headache (onset or worsening within the last 7 days)

History taking and the physical examination (with ocular fundus) search for signs of intracranial hypertension (headache particularly intense at awakening in the morning, vomiting, visual blurring, papillary edema at the ocular fundus) that are suggestive of an expansive intracranial process or neck pain suggestive of dissection of the cervical arteries.

**In case of unusual headache that came on or worsened within the last 7 days, brain imaging should be performed rapidly to search for an expansive intracranial process or a vascular cause (Professional agreement).**

Ideally, brain MRI with T1, T2, FLAIR, and T1 injected sequences will be performed to search for contrast uptake and



**Fig. 2 – Schematic representation of the diagnostic strategy.** CT: computed tomography; CRP: C-reactive protein; MRI: magnetic resonance imaging; CSF: cerebral spinal fluid; RCVS: cerebral vasoconstriction syndrome; PRES: posterior reversible encephalopathy syndrome.

signs of venous thrombosis. A T2\* sequence can also be ordered to identify potential bleeding and contribute to the search for venous thrombosis. The supra-aortic trunks will be explored to search for dissection, warranting a fat-saturation sequence but also MR angiography of the supra-aortic trunks (Professional agreement).

Unless there is an emergency, and if MRI is easily accessible, CT is not needed [29]. If MRI accessibility is limited, a brain CT without contrast injection should be performed (Professional agreement).

If intracranial hypertension is suspected and imaging does not provide the diagnosis, CSF analysis is needed (Professional agreement). Pressure should be measured in a specialized center. An ocular fundus is also needed.

If the imaging work-up fails to provide diagnostic evidence, lumbar puncture can be an option to search for meningitis or a CSF pressure disorder (Professional agreement). This puncture should not be made if spontaneous intracranial hypotension is suspected (orthostatic headache is part of the presentation). In this situation, brain MRI with injection should be preferred. Lumbar puncture will include a measure of opening pressure (hypotension < 6 cm H<sub>2</sub>O, or hypertension > 25 cm H<sub>2</sub>O) [5]. In the event of idiopathic intracranial hypertension, the ocular fundus visualizes papillary edema and the MRI may show an empty sella turcica, dilatation of the peri-optic subarachnoid spaces, narrowing of the lateral sinus, or a flatten posterior

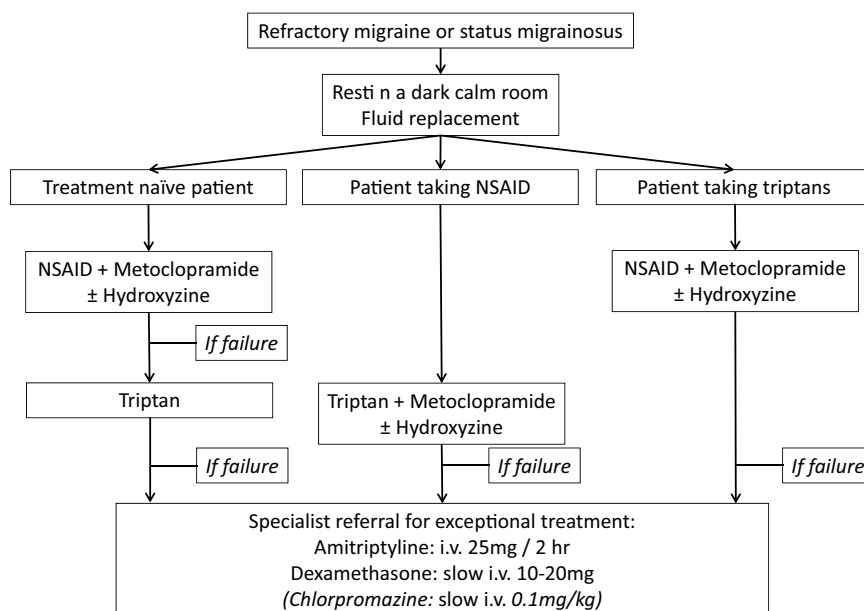
portion of the sclera [30]. In the event of idiopathic intracranial hypotension, the cerebral MRI may show meningeal contrast uptake [31–33]. When intracranial hypotension is suspected, the MRI should be performed before the lumbar puncture (Professional agreement).

In patients aged over 50 years, blood tests will include cell counts, electrolytes, BUN, liver tests and C-reactive protein in all cases. An inflammatory syndrome is suggestive of giant-cell arteritis (Horton's disease) (Hunder *et al.*, 1990) (Professional agreement).

It is not recommended to assay D-dimers to rule out a diagnosis of cerebral venous thrombosis; approximately 20% of patients with thrombi causing isolated headache have a normal D-dimer level (Grade B) (Fig. 2).

## 8.2. Emergency care

The initial work-up should not only search for evidence of secondary headache, but should also identify the diagnostic framework in patients with primary headache. The description here will be limited to primary headache as care for secondary headache is determined by the etiology, associated with symptomatic treatment for pain relief. It is simply recalled that the treatment of RCVS is based on the administration of nimodipine, given empirically at the same dose as in subarachnoid hemorrhage, in combination with



**Fig. 3 – Therapeutic management of acute migraine or status migrainosus in the emergency setting. In the event of nausea or vomiting, NSAID can be administered intramuscularly or intravenously, metoclopramide and hydroxyzine intravenously, and triptans by nasal spray or subcutaneously (sumatriptan). In general, intravenous administration should be preferred over oral administration; rehydration should be favored.**

symptomatic treatment for headache (**Professional agreement**). All treatments with a vasoconstrictor effect should be discontinued. Furthermore, response to analgesic treatment is not indicative of a primary cause and should not be considered reassuring [17,34].

### 8.2.1. Migraine

For treatment of migraine attack, the patient should be advised to rest in a dark calm room (**Professional agreement**). Fluid replacement (oral or intravenous) is also important (**Professional agreement**). The medical treatment will be adapted to the patient's current regimen. Oral NSAID are the first-intention drugs (diclofenac 50–100 mg, ibuprofen 400 mg, ketoprofen 100–150 mg, naproxen 500 mg), or a combination of aspirin 900 mg + metoclopramide 10 g (**Grade A**) [35–38]. Ibuprofen and ketoprofen have marketing approval for migraine in France. It is recommended to use a dose of 400 mg for ibuprofen and 100–150 mg for ketoprofen. In patients with a contraindication for NSAID, one gram of acetaminophen combined with 10 mg metoclopramide can be a good alternative (**Grade A**) [39]. If the patient has already taken NSAIDs (or acetaminophen + metoclopramide) at a proper dose and without efficacy, triptans can be proposed (**Grade A**) [39]. For attacks that fail to respond to first-line treatment, metoclopramide in a slow intravenous infusion (10 mg/15 min) should always be given for its anti-emetic effect if the patient has nausea [37,40,41], but also for its anti-migraine effect [42,43] (**Grade A**). Since metoclopramide is a dopaminergic antagonist, an anti-cholinergic agent may be added to avoid extra-pyramidal effects, especially akathisia (**Grade C**). Slow administration avoids the risk of akathisia [44,45] (**Grade B**). In published studies, metoclopramide was combined with diphenhydramine (anti-histamine H1 agent

with anti-cholinergic properties), but this product is not available for intravenous administration in France. The closest product is hydroxyzine which we propose. It is however not common to use this product for this indication.

If the patient started by taking triptans, a NSAID may be prescribed (**Professional agreement**). If nausea and vomiting preclude oral intake, the NSAID (ketoprofen 100 mg, aspirin 1000 mg) may be administered by intravenous injection and metoclopramide by intravenous infusion [43,46–49] (**Grade B**). For triptans, the only product with a nasal spray formulation is sumatriptan. As a last resort, if the nasal spray is not tolerated, a subcutaneous injection can be used (**Grade A**) [50]. Intravenous infusion of amitriptyline (25 mg/2 h) can be proposed if migraine persists despite use of triptans and NSAIDs (**Professional agreement**). Dexamethasone (10 mg i.v.) can be used, despite moderate efficacy [51] (**Grade A**).

As a last resort, phenothiazine derivatives may be used. Prochlorperazine has a better level of proof, but is not available in France [52]. Otherwise, chlorpromazine (Largactil®) (slow i.v. infusion 0.1 mg/kg) can be proposed [53] (**Grade A**). The patient should be advised of the major sedative effect. Despite a good level of proof, the acute and chronic adverse effects of this treatment are non-negligible so that this therapeutic option should be strictly limited (**Professional agreement**).

It is recommended to not use magnesium intravenously (**Grade A**) [54]. It is also recommended to not use opiates (**Grade C**) [29,55,56].

### 8.2.2. Status migrainosus

There is no recognized treatment for this rare entity that is a diagnosis of exclusion. The patient should be referred to an emergency ward to ensure intravenous treatment. Amitriptyline can be used (i.v. 25 mg/2 hr) (**Professional agreement**).



Dexamethasone (i.v. 10 mg) can be used, despite moderate efficacy [51] (Grade A). Otherwise, chlorpromazine (Largactil®) (slow i.v. infusion 0.1 mg/kg) can be proposed [53] (Professional agreement). The patient should be advised of the major sedative effect. Despite a good level of proof, the acute and chronic adverse effects of this treatment are non-negligible so that this therapeutic option should be strictly limited (Professional agreement) (Fig. 3).

### 8.2.3. Tension-type headache

First-intension treatment relies on use of an analgesic drug (acetaminophen 1 g) or a NSAID (ibuprofen 400 mg or ketoprofen 100 mg) [57,58] (Grade A). Here again, metoclopramide can be added for its analgesic effect, with the usual precautions, if the attack fails to respond [59] (Grade A). As a last resort, amitriptyline can be proposed by intravenous infusion (25 mg) (Professional agreement).

### 8.2.4. Cluster headache

Two first-line treatments have marketing approval in France for acute attacks [7]:

- sumatriptan, 6 mg sc SC (Grade A);
- oxygen (12–15 L/min) using a high-concentration mask for 15–20 min (Professional agreement).

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V. Gilard has nothing to disclose.

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<sup>4</sup> AFCAVF: Association française contre l'algie vasculaire de la face.

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