Dural sinus thrombosis due to hormonal contraception

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Headache is a common complaint encountered in outpatient clinics and emergency rooms. It can be due to a wide variety of diseases, ranging from a simple tension headache to more serious intracranial pathologies. Dural sinus thrombosis is an uncommon cause of headache that can rarely complicate the use of hormonal contraception. Herein, we present a 42-year-old woman with a 2-month history of headache resistant to usual treatment regimens. The recent introduction of monthly injections of combined estrogen and progesterone for contraception provoked further workup that confirmed the presence of dural sinus thrombosis. Warfarin therapy was initiated and the patient later required a ventriculoperitoneal shunt for symptom relief. Clinicians should maintain a high index of suspicion when evaluating a patient with resistant headache while on hormonal contraception.

Case presentation

A 42-year-old woman with no past medical history began experiencing recurrent headaches for 2-month duration. She described the headache as frontal, dull aching, 6/10 in severity, and associated with nausea and vomiting. Acetaminophen and various NSAIDs provided no relief, which prompted her to seek medical advice. She had no history of smoking, diabetes mellitus, hypertension, or prior blood clots. Six months earlier, she began receiving monthly injections of combined estrogen and progesterone for contraception. On examination, her BMI was 25 kg/m².

Discussion

Dural sinus thrombosis is an uncommon condition with varied clinical presentation usually affecting middle-aged women. It has acquired attention recently because of improved imaging techniques and better awareness among physicians, particularly neurologists. Although more than 100 causes [1] have been described in the literature, pregnancy and puerperium are the most frequent risk factors [2]. A study in the USA, based on the data from the 1993–1994 healthcare cost and utilization project, estimated that dural sinus thrombosis complicated 11.6 in every 100,000 deliveries, and that increased maternal age was a major risk factor [3]. Prothrombotic states are another important cause for dural sinus thrombosis.

Since the introduction of hormonal contraception in the early 1960s, case reports emerged describing its association with increased risk of thrombosis [4]. This has been presumed to be because of the estrogenic component irrespective of the route of administration. More recent data showed a higher incidence of venous thrombosis with third-generation (desogestrel and gestodene) rather than second-generation progestins (e.g., levonorgestrel and norgestrel), with an estimated risk of 1.4–4 times as high as that associated with second-generation preparations [5,6]. The procoagulant effect of oral contraceptive pills (OCPs) is due to the resultant increase in the levels of antithrombin and protein S [7].

Despite a low absolute risk (15 cases per 100,000 cardiovascular events per year), women who are taking
OCP have a 3–6 times greater risk of venous thromboembolism than women who do not [8]. The risk is highest during the first year and increases with age (> 35 years), obesity, recent surgery, and some forms of thrombophilia, especially factor V Leiden mutation [9]. For this reason, some experts believe that all first-time OCP users should be screened for factor V Leiden mutation [10]. Women with prothrombotic defects and concomitant oral contraceptive use had an increased odds ratio of 30 to develop cerebral sinus thrombosis, relative to women that did not carry this defect [11]. The most common sites of thrombosis associated with OCP are the deep veins, which may be complicated by pulmonary embolism. Arterial thrombosis is less frequent and is usually predisposed by other concomitant risk factors, such as smoking [12].

It is generally accepted by medical authorities that the health risks of OCP are lower than those from pregnancy and birth. However, complications are still possible in a certain category of high-risk patients. For this reason the WHO has created a graded scheme of precautions when considering which patients should not use hormonal contraception. Women identified with WHO category 4 diagnoses should not be given OCP [11]. Category 4 includes patients with a history of venous thromboembolism, cerebrovascular or coronary artery disease, patients whose age is greater than 35 years and smoke 20 or more cigarettes per day, patients with history of headache with focal neurological symptoms, prior history of diabetes mellitus with complications, hypertension (blood pressure of >160/100 mmHg or with concomitant vascular disease), patients with liver disease, patients with breast
cancer, and patients undergoing major surgery with expected prolonged immobilization. In an attempt to reduce the risk of thrombosis, products with lower dosage of estrogen should be utilized (e.g. Alesse, Loestrin 1/20, Levlite, and Micrette).

Headache resistant to treatment in middle-aged women taking OCP should not be taken lightly, especially when the more common causes of headache are excluded. Two serious conditions must be promptly ruled out: benign intracranial hypertension and dural sinus thrombosis. Fundoscopic examination should be performed looking for signs of increased intracranial pressure. Papilledema can be a latent sign of increased intracranial tension and its absence does not rule out intracranial hypertension. Benign intracranial hypertension is characterized by the presence of slit-like ventricles on the CT brain and increased cerebrospinal fluid pressure greater than 25 mmHg. Dural sinus thrombosis, which has a worse prognosis, is not evident on noncontrast brain CT, and MRI/venogram with and without contrast is necessary to confirm the diagnosis. Although CT contrast venography remains popular in some centers and may be a superior technique in certain cases [13], the classic empty delta sign is present in only 20% of the cases [14].

**Conclusion**

Dural sinus thrombosis is a rare and under-recognized cause of headache that should be considered in women with recent introduction of hormonal contraception. The absence of papilledema and a negative CT brain should not halt further workup. MRI/venogram is mandatory to confirm the diagnosis.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

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