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Original article

A review on the historical investigation of dysmenorrhea from Abulcasis's point of view

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Abstract

Background: Dysmenorrhea is a frequent medical condition with painful menstrual cramps, which can cause infertility. The aim of this study was to discuss the viewpoints of Abulcasis (Abulcasis) about dysmenorrhea. In addition, Abulcasis's definitions of dysmenorrhea and his treatment approaches were described and compared with the current terminology of modern medicine.

Methods: The literature used for this paper was collected through hand search of published ancient medicine texts and the electronic databases, Web of Science, PubMed, and Google Scholar. Full-text articles between the years 1926 and 2017 were reviewed in terms of appropriacy.

Results: Albucasis (936-1013 AD), the Andalusian physician, was an early scientist describing dysmenorrhea in his medical textbook, Al-Tasrif. Abulcasis' points of view about dysmenorrhea were based on humoral theories. He classified menstrual pain into three categories based on the etiologies. Tree proposed pathologies, focusing on decreasing blood flow, are comparable with what is explained about the function of prostaglandins in current medicine. He suggested therapeutic plans including lifestyle modifications, oral and topical herbal remedies.

Conclusion: Current findings depicted that most of the medicinal plants mentioned by Abulcasis can reduce pain in women with dysmenorrhea. In addition, most of his opinions can be compared with current medical concepts.

Keywords: Dysmenorrhea, History of Medicine, Medieval History

Introduction

Dysmenorrhea, literally affecting 45-90% of women worldwide (1), can be classified into primary and secondary (2). Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and oral contraceptive pills (OCPs) have proven to reduce abnormal uterine contractions and cramping pain by blocking prostaglandins production and are the most commonly used drugs to relieve primary dysmenorrhea (3).

Although prostaglandin is a current concept in medical sciences, a quick search in ancient texts of medicine shows that it has a root in the antiquity, in particular in Persian medicine. Persian medicine is a traditional system of medicine based on humoral theory, dating back to at least 7000 years ago (4). Later, in early Islamic era (9-13th century AD; medieval time), it was flourished and remained as the main paradigm of medical sciences in most parts of the world until Renaissance (5) and most of compendium textbooks of Persian physicians like Canon of Avicenna were taught in medical universities in Europe until seventieth century AD (6).

Prior to the introduction of Islam in ancient Persia (637 AD), contemporaneous to Sassanid dynasty (224-637AD), physicians knew about the normal menstruation. A Pahlavic manuscript, for instance, is entitled: "Bun-Dahišn", which is the first remained

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reported document on menstrual cycle and its three phases during monthly period, which is supposedly related to the current concepts in gynecology (7). Persian great physicians believed that normal menstruation would influence a woman's health and that any changes could affect the whole body (8).

Dysmenorrhea and amenorrhea were considered as abnormal conditions in ancient Greek texts. According to Hippocrates (5th century BC), dysmenorrhea occurs due to menstrual blood flow interruption because of cervical obstruction which causes the painful menstrual cycle regardless of the quality of menstruation (9). According to his point of view, congenital uterus stenosis might be a reason for blood flow difficulties; therefore, these women were urged to marry and have labor as quickly as possible to get rid of menstrual pain (10). There are some more reports in Persian medicine. According to the Canon of Avicenna (10th century AD), there is some kind of low back pain based on uterus disorders. The pain happens either before or during menstruation period or in a kind of disease called "Khafaghan-e Rahem" (strangulation of uterus) (11). Haly Abbas (10th century AD) described dysmenorrhea in his legendary text of Kāmil al-Sinaāas, "women with scanty flow of menstrual bleeding who suffered from painful menstruation" (12). Ismaeil Jorjani (11th century AD) also described normal menstruation period in the chapter of Gynecology in his book of Zakhireh Karazmshahi. Although Jorjani did not exactly describe dysmenorrhea, he described it in the chapter of joints and bone's diseases as: "Some kinds of back pain are originated by uterus which warm cupping in the umbilical area, especially in the beginning of menarche, can relief pain" (8). These are preliminary descriptions, but they are far from complete. It seems that Abulcasis was the first physician who proposed dysmenorrhea. Persian medicine, as the main paradigm of medical sciences in early medieval period, was practiced in all Islamic territories like Andalusia (current Spain). Abulcasis (Al-Zahrawi 936-1013AD) was an Andalusian physician who was famous, particularly in surgery. He had also great contributions to the field of gynecology and invented many surgical tools in this field. He also made myriads of diagnostic and therapeutic recommendations in the field of gynecology (13).

This study reviews the viewpoints of Abulcasis (Abulcasis) about dysmenorrhea. In addition, Abulcasis's definitions of dysmenorrhea and his treatment approaches are described and compared with the current terminology of modern medicine.

Materials & Methods

The literature for this paper was collected through electronic databases, Web of Science, PubMed, Google Scholar and hand search of published ancient medicine texts. Full-text articles between the years 1926 and 2017 were reviewed for appropriate articles.

Results

Abulcasis (Al-Zahrawi): Abul Qasim Khalaf Ibn Al-Abbas Abulcasis, known in the West as "Abulcasis", was born (936 AD) and grew up in Al-Zahra, six miles northwest of Qurttoba (Cordova or Cordoba) in Andalusia (Spain) (14) (Fig.1), which was the torch bearer of knowledge, wisdom and civilization and is currently a part of Europe (15).

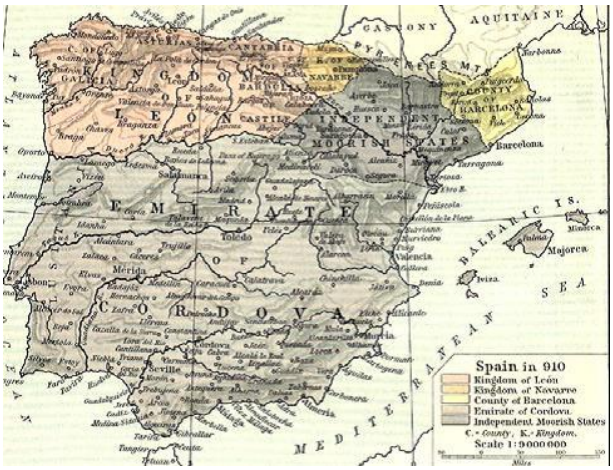

Fig 1. The Extent of Emirate of Cordova in 910 AD.

He studied, taught and practiced medicine and surgery until shortly before his death in Cordoba, two years after the sacking of Al-Zahra. He attended Cordoba University, which had been established one and a half century before his time (16). He influenced Andalusia's Islamic medicine and surgery, and his influence remained even one thousand years after his death (17). After nearly five decades of medical career, full of great original contributions particularly in the court of Andalusian Caliph Al-Hakim, Abulcasis died in 1013 AD (18) (Fig.2).

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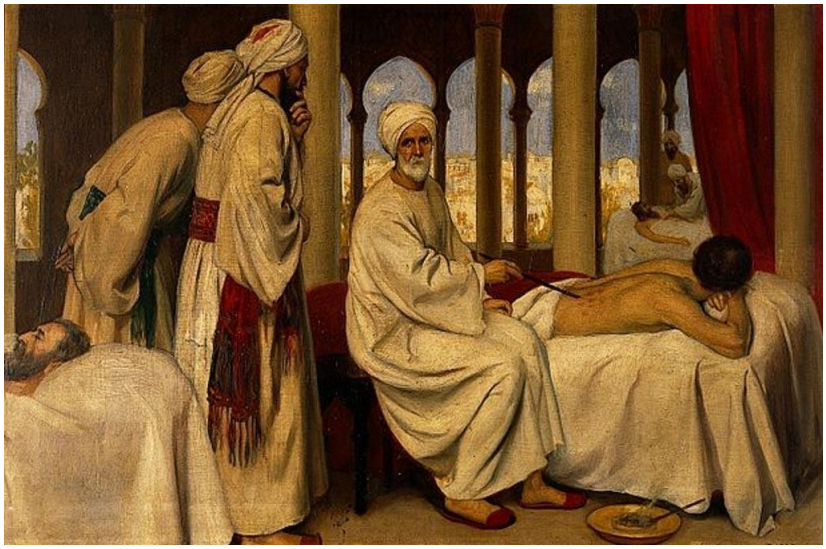

Fig 2. A painting that shows Abulcasis blistering a patient in the hospital in Cordova

He devoted his entire life and genius to the advancement of medicine, particularly surgery. His best work was the Kitab Al-Tasrif in Arabic, which was translated into Latin by Gerard of Cremonia in the 12th century and had such a tremendous influence on surgery in the West. The French surgeon Gye de Chauliac referred to Al-Tasrif over 200 times in his book (completed in 1936) (19).

Al-Tasrif took Avicenna's "The Canon of Medicine" as the textbook of medical education in many European universities between 12th–17th centuries AD (20). It compromised many pictures of surgical tools, mostly invented by Abulcasis himself, and explanations of their use (Fig.3). Abulcasis was the first scientist who described the "Walcher position" in obstetrics and gynaecology (17). He remained the most famous surgeon and teacher during the middle Ages and Renaissance in Europe. He is also the first scientist who described ectopic pregnancy as a fatal affliction in 963 (21, 22).

Dysmenorrhea in Al-Tasrif and comparing it with current medicine: Abulcasis defined dysmenorrhea by these words: "Some women experience pain two or three days before menstruation in the pre-umbilical or low back area. Premenstrual pain is accompanied by fatigue and a sense of heaviness. Sometimes the pain is so severe that they feel erupting like a volcano. This condition continues until bleeding happens". In current medicine, primary dysmenorrhea is defined as fluctuating and spasmodic menstrual cramps without any macroscopic pathology. It always begins few hours before or with menstrual bleeding and lasts maximum

Fig 3. A page of *Al-Tasrif* depicting the surgical tools devised or utilized by *Abulcasis.* Kept in Institute of Manuscripts of Azerbaijan National Academy of Sciences in Baku

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2–3 days. Menstrual pain is located in suprapubic and radiates into the medial part of the thighs. High percentage of cases frequently experience feeling exhausted backache, nausea, vomiting, and diarrhea, too (3).

Abulcasis classified etiology of dysmenorrhea in three groups:

1) Vessels narrowing (primary or secondary) that may lead to the reduction of uterine blood flow. In 1924 DI Macht and colleagues found that all secretions of menstruating women contain a toxic substance 'menotoxin' that is characterized by specific chemical reactions (23). Pickle experiments proposed that menotoxin is secreted by uterus endothelium and called it 'menstrual hormone' (24). His experiences indicated that this hormone stimulates smooth muscles and suggested that primary dysmenorrhea might be a result of menstrual hormone on myometrium (25). These hormones might be prostaglandins, deriving from hydroxyl fatty acid and is isolated from seminal plasma discovered in 1935 by the Swedish physiologist Ulf von Euler for the first time (the name of it derives from the prostate gland) (26). The destruction of the endometrial cells during menstruation can cause the release of Prostaglandins F, which can lead to uterus contraction subsequently (27).

2) Blood hyper viscosity due to viscous phlegm (Balgham) or black bile (Sauda). Since, Abulcasis believed in humoral theory, this part of his definition could not be exactly matched with current medicine.

3) Tense swelling around the vessels of uterus that prevents blood from flowing in its usual pathway. From Abulcasis's point of view, any external agents, such as the pressure caused by a swelling, could reduce the uterus blood flow. Abulcasis mentioned that the third type is more difficult for treating, too. If any external factor is found for the uterine blood flow reduction in current medicine, primary dysmenorrhea will be ruled out. Therefore, it seems that the third type in Abulcasis point of view could be matched with the secondary dysmenorrhea in current medicine. This type of dysmenorrhea is not easy to treat and requires the diagnosis and treatment of the underlying factors. Then he explained that due to these three etiologies, the administrative power of the body (called in Persian medicine as "the nature of the body") has to exert more expelling force to maintain the blood flow. This extraordinary force makes tension in the vessels and causes extreme pain. So Abulcasis said: "The pain will be relieved after vaginal bleeding." In current medicine, it is proven that prostaglandins are released from the endometrium and can affect the myometrium. Therefore, induced tension and spasm in the myometrium cells produce pain (28).

Intervention in Al-Tasrif and comparing it with current medicine: According to the viewpoints of Abulcasis, each pathological condition associated with dysmenorrhea needs its own kind of treatment (Table 1). He recommended lifestyle modification such as moderate exercise, fine, fresh and tenuous food (the foods he believed that dilute the blood such as soft-boiled egg yolk and young lamb) and depletive bath

Table1. Abulcasis's classification and General treatment of dysmenorrhea

Pathology	General treatment	Explanation
Vessels narrowing that may lead to reduce blood flow	Life style modification	moderate exercise, fine, fresh and tenuous food and depletive bathes like combination of wet and dry sauna
Blood hyper viscosity	Vasodilation and increasing blood flow with oral decoction	decoction ingredients effect as emmenagogue, unblock channels and vessels and makes humors fine
Tense swelling occurrence around the vessels of uterus	external use of drugs reducing swelling	Vaginal steam bath, enema and embrocation

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(bathing with both wet and dry sauna that causes sweating and the depletion of extra body fluid) every day before menstruation, especially for the first type of dysmenorrhea in Abulcasis classification with vasoconstriction.

In current medicine, with emphasis on data from experimental studies, moderate exercise can reduce the duration and severity of dysmenorrhea (3). Several studies showed that dietary supplements of Omega-3 polyunsaturated fatty acids have a positive effect on symptoms of primary dysmenorrhea. Therefore, lower consumption of fish, eggs, and fruit was reported to be a risk factor for menstrual disorders (29). It has been reported that, wet and heat bath or applying topical heat on the abdomen, two to three days before the menstrual period are effective in reducing the duration and severity of pain (30).

Abulcasis has proposed some decoction for the second groups with blood hyper-viscosity, to take prescription three or four days before menstruation. The ingredients act as emmenagogue while unblocking the channels and vessels (called in PM as “Mofatteh”). As a result, humors will be fine, menstrual flow will be increased, and pain will be reduced. The components of one of these decoctions mentioned by Abulcasis for treating dysmenorrhea and their current pharmacological effects are listed in (Table 2). As seen in Table 2, most of the mentioned medicinal herbs such as Dill, Cinnamon, Chamomile, Black cumin and Fennel, etc. was examined in human studies for their efficacy on dysmenorrhea (31, 32).

His recommendation for the third group was the external use of some herbs in the shape of vaginal steam bath. In addition, he recommended suitable (soft) herbal oils for anointing. He prescribed greasy enema and embrocating with mixture of almond oil (sweet or bitter) and some wet oil continuously, to relieve primary edema causing dysmenorrhea.

Traditional vapor-based therapies in the modern health care systems are still used as herbal remedies (33). Women with the following conditions may benefit from vaginal steam: uterine fibroid formation, dysmenorrhea, irregular menstruation, ovarian cysts, endometriosis, reproductive adhesion scar, previous vaginal tear or episiotomy, and spotting (34).

Du Gaiyun and colleagues reported that enema is a safe and reliable recommendation in China as TCM prescription. Tiaojing Huoxue decoction enema can effectively relieve the severity of the pain of secondary dysmenorrhea in patients with endometriosis (35). Sun-Hee Han and colleagues found that abdominal massage with lavender, clary sage, and rose in almond oil before menstruation is effective in decreasing the severity of menstrual cramps (36).

Discussion

Although, in “Bun-Dahišn” (very old medical manuscript), normal menstrual cycles were explained, dysmenorrhea is not mentioned in most ancient medical textbooks. It seems that dysmenorrhea was not a common disease in the past. Perhaps, some preventing reasons in woman such as lifestyle observations (principles of nutrition, physical activity, and low stress living condition), made the prevalence of dysmenorrhea lower than now. "Abulcasis" is one famous Muslim physician in the medieval age. His humoral medicine belief is one of the oldest paradigms of medicine and his comprehensive medical textbooks had shaped the European surgical procedures until the Renaissance and later (12).

Abulcasis’s point of view about dysmenorrhea is based on humoral theories. He explained, classified and managed dysmenorrhea in the terminology of his own time (which seems different to us). It seems that the basic parts of his etiologies are the same as modern definitions. Abulcasis explained three proposed mechanisms for decreasing uterine blood flow in the case of dysmenorrhea. The first one is decreasing the vascular caliber of uterus. It is compared with the effect of prostaglandins on vessels in uterus which is considered the main pathology of dysmenorrhea in current medicine (13).

Gynecologists believe that there is an excessive secretion of endometrial prostaglandin in women with primary dysmenorrhea during menstruation, which results in abnormal uterine contractions. Strong and abnormal contractions reduce uterus blood flow, leading to myometrium hypoxia or ischemia, which can ultimately cause spasmodic pain (37). While Abulcasis did not know anything about prostaglandins, it seems that the mechanism of their effects was clear to him. Abulcasis, in addition to vessels narrowing (that is related to the tissue of vessels), proposed two other probabilities for decreasing blood flow, causing dysmenorrhea. The first one is related to the quality of blood that circulates in the vessels of the uterus.

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Table 2. Components of "*Mofatteh*" drug mentioned by Abulcasis, for treating dysmenorrhea and their Phytochemical and Pharmacological roles in formulation according to recent studies

	Persian name	Amount in formulation	English name	Scientific name	Part of plant	Type of study	Pharmacological activities	Phytochemicals	Surveys
1	*Babooneh*	30 gr	Chamomile	*Matricaria chamomilla L.*	Flower	*In vivo &* Human study [50]	Analgesic, Anti-inflammatory, Anti-spasmodic, Anti-anxiety	Alpha-Bisabolol, Matrisin, Flavonoid, Apigenin, Phytoestrogen	(50)
2	*Shabet*	30 gr	Dill	*Anethum graveolans L.*	Leaves	*In vivo &* Human study	Analgesic, Anti-inflammatory, Anti-spasmodic, Sedative, Anti-peristaltic, Utero trophic, Estrogenic effect, Vasodilator, Anesthetic, Emmenagogue	Aesculetin, Ascorbic-Acid, Thymol, Alpha-Pinene, Anethole, Apigenin, Limonene, Carvacrol, Sabinol	(31)
3	*Ezkhar*	30 gr	Lemon grass	*Cymbopogon citratus DC.*	Leaves	Historical use	Anti-inflammatory	Terpenes, Alcohols, Ketones, Aldehyde and Esters	(51)
4	*Marzanjush*	30 gr	Marjoram	*Origanum majorana L.*	Leaves	*In vivo &* Human study [54]	Anti-oxidant, Anti-anxiety, Emmenagogue	Terpenoids, Flavonoids, Tannins, volatile oil,	(52)
5	*Salikhah*	30 gr	Chinese cinnamon	*Cinnamomum cassia L.*	Bark	Historical use			(53)
6	*Darchin*	30 gr	Cinnamon	*Cinnamomum verum J.Presl*	Bark	*In vivo &* Human study [57]	Inhibit Biosynthesis of Prostaglandins, Anti-inflammatory, Vasodilator, Anti-spasmodic, Sedative, Anesthetic, Vasodilator	Eugenol, Epicatechin, 1,8-Cineole Cinnamaldehyde	(54)
7	*Ghost*	30 gr	Costus	*Costus arabia L.*	Rhizome	Historical use	Anti-oxidant	tannins, alkaloids, flavonoids and saponins, phenol and flavonol	(55)
8	*Sonboletib*	30gr	Indian Valerian	*Valeriana officinalis L.*	Root	*In vivo&* Human study [60]	Sedative, Anti-spasmodic	Valerenic Acid, Valterate, Isovalerate, Geraniol, Glutamic-Acid	(56)
9	*Nakhonak*	30gr	Milkvetch	*Astragalus kamesus L.*	Fruit	Historical use	Anti-inflammatory, Analgesic	Flavonol glycoside, galactopyranoside, isoquercitrin, astragalin	(57)
10	*Shoniz*	15 gr	Black cumin	*Nigella sativa L.*	Seed	*In vivo&* Human study [63]	Emmenagogue, Anti-spasmodic	Stachydrine Thymoquinone	(58)
11	*Bazre Karafs*	15 gr	Celleryseed	*Apium graveolans L.*	Seed	*In vivo &* Human study	Emmenagogue, Anti-inflammatory	Cnidilide Arthritin	(59)
12	*Badian*	15 gr	Fennel	*Foeniculum vulgare Mill*	Seed	*In vivo &* Human study [66]	Analgesic effects in uterus by inhibiting contractions induced by oxytocin and prostaglandins	Phenol, Pholic glycoside, TranseAnetole, Estragole, Fenchone.	(60)
13	*Soadekufi*	15 gr	Cyperus	*Cyperus rotundus L.*	Rhizome	*In vivo&* Human study		β-himachalene, α-humulene, γ-himachalene, felavenoid	(61)
14	*Berenjasef (Bumadaran)*	15 gr	Yoarrow	*Achillea wilhelmsii K Koch*	flower	*In vivo &* Human study [70]			(62)
15	*Hasha*	15 gr	Thyme	*Ziziphora clinopodioides Lam*	leaf	*In vivo &* Human study	Anti-inflammatory, Prostaglandin synthesis-inhibitor, Anti-nocieceptive	Betulin, Thymol, Carvacrol	(63)
16	*Hanzal*	15 gr	Bitter apple	*Citrullus colocynthis L.*	Fruit	*In vivo &* Human study [72]		Alcholes, ketones, epoxy compounds, hydrocarbons	(64)
17	*Kornab*	5 gr	Persian Cabbage	*Brassica oleracea L.*	leaf	Historical use		carotenoids, tocophenols and polyphenolics	(65, 66)
18	*Gandana*	5 gr	Chives	*Allium ampeloprasum L.*	leaf	*In vivo&* Human study		Diallyl sulfides	(67)
19	*Salgh*	5 gr	Beet	*Beta vulgaris L.*	Root	Historical use		Anti-oxidant	(68, 69)
20	*Sodab*	5 gr	Rue	*Ruta graveolans L.*	leaf	*In vivo&* Human study 79	Anti-inflammatory	Furanocoumarin,quinolone, alkaloid, quinolone	(70)
21	*Feodanaj*	5 gr	Pennyroyal	*Mentha longifolia L.*	leaf	*In vivo&* Human study [50]	Analgesic, Anti-spasmodic	Menthol	(71)

Through his humeral theory, Abulcasis declares that blood hyper viscosity, due to viscous phlegm (Balgham) or black bile (Sauda), can cause reducing blood flow and then pain will appear. These factors are not related to the current trends in gynecology. This type could be explained in current medicine as Idiopathic dysmenorrhea. Although prostaglandins were known as the main reason for primary dysmenorrhea, about 18% of women with dysmenorrhea do not response to NSAIDs (38). These groups are the pitfalls for gynecologists and alternative treatments may be helpful to them. Perhaps this kind of drug-resistant dysmenorrhea can be considered as the second group of Abulcasis classification. The second

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probable etiology, except for uterus vessels vasoconstriction that is proposed by Abulcasis, is external pressure. For any reason, this pressure can lead to the narrowing of the vessels inside the tissue of uterus, reducing blood flow and feeling pain. This kind of menstrual pain in the viewpoint of Abulcasis probably refers to secondary dysmenorrhea in current gynecology. Treating this kind of dysmenorrhea was difficult from the perspective of Abulcasis, as there is not an ordinary management in current medicine for secondary dysmenorrhea.

In references of gynecology, secondary dysmenorrhea refers to painful menstruation associated with pelvic pathology. The prevalence of secondary dysmenorrhea is 10% in young adults. This type of dysmenorrhea is more likely to be associated with chronic pelvic pain, mid-cycle abdominal pain and dyspareunia (28). One of the most common causes of secondary dysmenorrhea is endometriosis. The majority of endometriosis implantation is located in the pelvic area, especially in both ovaries. Improper hormonal activity, inflammatory mediators, and the pressure effect of ectopic tissue are the main reasons for pain in endometriosis. Other differential diagnosis of secondary dysmenorrhea include; adhesions, pelvic inflammatory disease, abscess, miscarriage, ectopic pregnancy, reproductive tract anomalies, ovarian cyst and rarely ovarian neoplasm (39).

Investigations show the relationship between prostaglandins (PGs) in secondary dysmenorrhea. Slices of normal endometrium, myometrium, ovary and adenomyosis, leiomyoma and affected ovary demonstrated that PGs production in endometriosis was significantly higher than that of other tissues and seems to induce more pain during menstruation (40). It seems that the important etiologies of secondary dysmenorrhea in current medicine could be associated with vasoconstriction and uterus blood flow decreasing that cause menstrual pain, too.

Based on this viewpoint and classification, Abulcasis' treatment was different and procedural in nature. As modifying and adopting a different lifestyle based on personalized viewpoint of Persian medicine are considered more important than medication, it is the first step in the management of dysmenorrhea. As the first mentioned pathology (narrowing the vessels) is more dependent on the status of the whole body, lifestyle modification is more important in this type. The relationship between food customs and menstrual dysfunction has been an accepted issue in current medicine. Although, NSAIDs is the first-line therapy for dysmenorrhea with efficacy rate 75-80% (41, 42) and has widely been recommended to women with ovulatory cycles. In individuals diagnosed with un-ovulatory cycle, Oral Contraceptive Pills could be used to suppress ovulation and relieve menstrual pain (43, 44). In some cases, other mechanisms such as behavioral and psychological factors, cervical narrowing or stenosis, and lack of exercise are implicated in the cause of primary dysmenorrhea, which should be considered (45). These kinds of dysmenorrhea do not respond to common drugs. Accordingly, it is important to evaluate the eating habits in young women and estimate their influence on menstrual disorders (46). In overweight woman, it was shown that a low-fat diet can decrease the severity and duration of dysmenorrhea, as weight loss can increase serum sex hormone binding globin concentration (47). More intakes of fish, egg, phytoestrogens and Vitamin E can facilitate the reduction of dysmenorrhea. It seems that these vitamins and minerals (supplements) could reduce prostaglandin formation by inhibiting arachidonic acid release (48). Abulcasis view of lifestyle modification is very close to the hygienic instruction in current medicine and is widely taken into consideration by patients and doctors as a therapeutic approach. In the second mentioned pathology (hyper viscosity of blood), Abulcasis focused on herbs that can reduce blood viscosity (herbs that can reduce thick Balgham or Sauda) and make vasodilation. Most of his suggested herbs have already been shown to have an effect on dysmenorrhea (49).

A careful consideration of Abulcasis's decoction components reveals that most of the ingredients of the compositions can relieve pain (especially menstrual pain). Following pharmacological effects; Analgesic, anti-inflammatory, anti-spasmodic, anti-anxiety, anti-spasmodic, sedative, anti-peristaltic, utero-trophic, estrogenic effect, vasodilator, anesthetic, emmenagogue and PGs synthesis inhibitor are shown experimentally for each part now. It seems that Abulcasis humoral suggestions can be good candidates for current evaluations to find new natural remedies in dysmenorrhea. As local therapies are safer and more convenient than general use of drugs, some therapeutic oils like sweet and bitter almond oil are suggested by

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Abulcasis, especially in the third type (edema or swelling out of vessels). Vaginal steam bath increases blood circulation of the reproductive organs, helps clearing vagina and cervix in general. Depending on the type of herbs in decoction, steam bath acts as antiseptic and purifying, antispasmodic, emmenagogue, infection preventive, healing of tight scarred tissues of the labia and perineum due to episiotomy and finally calms mind and body (33).

Treatment in current medicine is based on reduction of prostaglandins such as NSAIDs or contraceptives in case of married woman. Although these chemical treatments are the best choices, a lot of side effects have been reported for them. Researchers are doing many clinical trials on dysmenorrhea to achieve the best drugs and recommendations with the minimum side effects. So they are doing experiments on novel medicinal plants for reducing menstrual pain without considering the exact pathology of this pain. In the view point of Abulcasis, the potential effect of herbal medicine, as Emmenagogue, can be considered as a hypothesis for future studies.

As Abulcasis was one of the most prominent scientists of his era and the Al-Tasrif was one of the best comprehensive encyclopedias in traditional medicine; many of his proposed etiologies and interventions can be potentially considered as suggestions for further investigations and clinical research. Furthermore, this paper shed light on a part of the history of menstrual pain and dysmenorrhea dating back to 1000 years ago.

His three different probabilities are presented wisely. In modern medicine, we just focus on narrowing the vessels as the result of prostaglandins effect that can decrease blood flow and cause dysmenorrhea. But in Abulcasis point of view, even paying attention to the content of the vessels (changing the viscosity of blood) and external pressure on uterus tissue and consequently vessels, can affect blood flow.

Conclusion

This study shows Abulcasis's knowledge about dysmenorrhea. He was one of the most outstanding physicians and surgeons in his era. There were no detailed explanations about dysmenorrhea in the early medieval period before his time. Also, his approaches are mostly close to the current concepts of prostaglandins. Not only is it important to review Abulcasis's viewpoints about decreasing the blood flow as the cause of dysmenorrhea, but also it is vital to consider potential suggestions to find new natural remedies for its management.

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Conflicts of Interest

The authors have no conflicts of interest to declare.

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