ROLE OF SHALMALIGHRITA IN THE MANAGEMENT OF ASRIGDARA VIS-À-VIS ABNORMAL UTERINE BLEEDING (AUB): A REVIEW

Kumar Vijendra 1*, Gupta Shilpy 2

1Clinical Registrar, P.G. Department of Prasutitantra and Striroga, National Institute of Ayurveda, Jaipur, Rajasthan, India
2Ph.D. Scholar, P.G. Department of Kaumarbhritiya/Balroga, National Institute of Ayurveda, Jaipur, Rajasthan, India

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*Corresponding author
E-mail: dr.vijendra123@gmail.com

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ABSTRACT

Abnormal Uterine Bleeding (AUB) is variation in normal menstrual flow in terms of amount, frequency, duration and interval in menstrual cycle. The sign and symptom of abnormal excessive vaginal bleeding is given the term Asrigdara in Ayurveda treaties. Excessive uncontrolled bleeding is one of the major gynecological complain causing admission in hospital and later surgical intervention due to emergency created because of prolonged continuous bleeding. Conservative management is a need of time. There are many formulations mentioned in traditional practices to improve quality of life and to reduce the percentage of surgical interventions in gynecological disorder. The compound, Shalmali Ghrita has four ingredients viz. Shalmai Pushpa Niyasa (Salvia malabarica), Prishnaparn Phal (Urania picta), Gambhari Phal (Gmelina arborea) and Chandan Kalka (Santalum alba). It seems to be an effective combination to relieve symptoms and condition of patient.

Keywords: Asrigdara, Abnormal Uterine Bleeding, Shalmali, Ghrita.

INTRODUCTION

Abnormal bleeding per vaginum is one of the common gynecological problems among female of reproductive age group seeking medical intervention.1 Abnormal uterine bleeding (AUB) is variation in normal menstrual flow in terms of amount, frequency, duration and interval in menstrual cycle.2 AUB occurs in 9 to 14 % women between menarche and menopause.3 Prevalence varies from country to country. It is approximately 17.9 % in India.3 Among abnormal uterine bleeding (AUB); Heavy menstrual bleed (HMB) affects approximately 30 % of females in their reproductive period.4 It has been defined as excessive blood loss during menstruation, i.e. more than 80 ml significantly interfering physical, social and emotional status of woman. It can occur alone or in combination with other symptoms.5,6 In the search of knowledge, beginning from Veda to Samhita there is a vast collection and description of disease including their etio-pathogenesis, presenting features, methods of prevention and management. An exhaustive description of gynecological diseases is mentioned in Ayurveda treaties. The sign and symptom of abnormal excessive vaginal bleeding is given the term Asrigdara. Asrigdara literally means Dirana (excessive release) of Asrik (menstrual blood). Another term Raktapradara is also used which signifies Pradrirana (excessive discharge) of Rakta or Rajah blood.7

Various etiology of Asrigdara has been described in the classics. Excessive intake of Lavana (salts), Amla (sour or acidic), Katu (bitter), Vidadi (spicy), Krisara (rice gruel), Payas (milk), Dadhi (curd), Mastu (butter milk), Giru (heavy), Snigdha (oily), Mithya Ahar (incompatible diet) can cause Asrigdara.8 Pittavrita Apana Vayu9 increases the amount of blood (Ativridhi of Rakta). Viruddha Bhojana (incompatible foods), Madhya (alcohol), Garbhaprapata (abortion/miscarriage), Ati-maithuna (excessive indulgence in sexual activity), Atikarshana (severe emaciation), Atimargagamana (excessive walking or workout), Abhigatha (physical trauma), Diva-shayana (afternoon snap) and Shoka (mental stress) is considered to cause symptoms of Asrigdara by Madhava Nidana, Bhava prakash and Yoga ratnarak.

Formation of Raja (menstrual blood) is said to be from Prasaddhag (main/worth product) of Rasa.9 Acharya Kashyap has described the physiology of menstruation. Raja (blood) reaches Garbhakoshta (uterine cavity) during the reproductive cycle via Rajovaha Shiras (uterine blood vessels) and get expelled out at end of each menstrual cycle i.e. after completion of one month.11 Vata is responsible for expulsion of menstrual blood out of uterine cavity down to Yonimukha (vaginal orifice) each month. Amount of Artava is mentioned as four Anjali12 whereas Artavakala (duration of menstrual blood flow during each cycle) is of three days according to Vagbhata13 and Bhavamishra14, five days as per Acharya Charka15 and seven days according to Harita16 and Bhela.17

Asrigdara can lead to various conditions including Daurbalya (weakness), Bhrama (giddiness), Murchchha (mental confusion), Tama (syncope), Trisha (thirst), Daha (burning sensation), Pralapa (delirium), Pandu (anemia), Tandra (drowsiness), Vata Vyadhi (convulsion and other neurological disorders due to vitiation of Vata) as a result of excessive bleeding per vaginum.18

First and foremost management involves avoidance of etiological factors which can either prevent the morbidity or can be the best treatment in mild form. Different formulations as therapeutic measures have been mentioned for the management of manifested symptoms. In the present study pharmacological evaluation and relevance of probable mode of action of Shalmali Ghrita19 will be discussed along with evidence based scientific validation.
The compound, Shalmali Ghrita have four ingredients viz. Shalmali Pushpa Niyasa (resinous exudates of Salmalia malabarica), Prishnaparni Phala (fruit of Uraria picta), Gambhari Phala (fruit of Gmelina arborea) and Chandana Katka (Santalum alba).

Details of Individual Drugs

**Shalmali Pushpa Niyasa (Salmalia malabarica)**
Salmalia malabarica is Bombax malabaricum Linn. is a lofty, deciduous tree buttressed at the base. The tree grows 25-35 meters in height with old tree up to 60 meters. It is known as King of the forest due to their massive size and showy flowers. It is widely distributed throughout India, including the Andamans, up to 1500 m or even higher. In peninsular India, the tree is very common in the dry as well as moist, mixed deciduous forests.

**Pharmacological Properties**

is covered with 60 centimetre shaped calyx usually 3 lobed, diameter of an average of 3~5 centimetres cover the tree. Staminial tube in number of more than 60 is short and arranged in 5 sets. Stigma is light red in colour, up to nine centimetres in length. Ovary is pink in colour; its skin is covered with white silky hair of length approximately 1 mm. Its length is 1.5–2 centimetres.

**Pithekochemical Constituents of Shalmali**

**Flowers**

Flowers contain β-D-glucoside of β-sitosterol, free β-sitosterol, betacryptone, betacryptanol, kaempferol, quercetin and traces of essential oil21.

**Action and Uses of Flowers**

Laxative, diuretic, astringent and are good for skin troubles, intrinsic haemorrhage, conjunctivitis, splenomegaly and haemorrhoids.22

**Prishnaparni (Uraria picta)**

Prishnaparni consists of dried whole plant of Uraria picta Desv. (Fam. Fabaceae), an erect under shrub up to 90 cm high, distributed throughout the country.

**Taxonomic Rank**

Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Fabales; Family: Fabaceae; Genus: Uraria; Species: Picta.

**Vernacular Names**

Semal, Semar, Semal, Shemal and Pagun (in Hindi), Shimul (in Bengali), Silk cotton tree and Red silk cotton tree (in English), Simble (in Punjabi), Shemalo and Sawar (in Gujarati), Sawar and Simalo (in Marathi), Burug (in Telugu), Mullilavu (in Malayalam), Elavam (in Tamil).

**Sanskrit Synonyms**

Shalmali, Mocha, Picchila, Raktapushpa

**Description of Flower**

Shalmal (in Hindi) has thick skin of 1 to 2 cm, gradually tapering at end, cylindrical in shape, light yellow to buff externally whereas pale yellow internally. Its surface bears fine longitudinal striations. Stem is about 8.0 to 16.0 cm long, 0.2 to 0.4 cm in diameter, cylindrical, branched, pubescent, external surface light yellow to brown. Leaves are variable, imparipinnate, up to 20 cm or longer, up to 2 cm wide.

**Botanical Description**

**Macroscopic**

Root of Uraria picta has thickness of 1 to 2 cm, gradually tapering at end, cylindrical in shape, light yellow to buff externally whereas pale yellow internally. Its surface bears fine longitudinal striations. Stem is about 8.0 to 16.0 cm long, 0.2 to 0.4 cm in diameter, cylindrical, branched, pubescent, external surface light yellow to brown. Leaves are variable, imparipinnate, up to 20 cm or longer, up to 2 cm wide.

**Microscopic**

Root has 5 to 6 layers of thin-walled, tabular, regularly arranged cork cells; secondary cortex is composed of 4 to 6 layers of oval, tangentially arranged, thin-walled, parenchymatous cells; secondary phloem is composed of sieve elements, parenchyma and fibres traversed by phloem rays. Secondary xylem is composed of vessels, tracheids, fibres, crystal fibres and parenchyma traversed by xylem-rays; vessels are very few, mostly confined to inner and outer part of xylem; fibres similar to those of phloem fibres are arranged in close set concentric bands. Stem has single layered epidermis covered with cuticle, a few epidermal cells elongated outwards forming papillae; cortex 8 to 10 cells wide, consisting of oval to circular, thin walled, parenchymatous cell; phloem consisting of usual elements except phloem fibres. Midrib of Leaf consists of single layered epidermis on either surfaces covered with striated cuticle having a few unicellular or bicellular, hooked or straight and pointed tipped hairs present on both surfaces but more on lower surface; collenchyma and parenchyma is 2 to 3 layered. Lamina has single layered epidermis on either surfaces, mesophyll is differentiated into single layered palisade and spongy parenchyma which has numerous paracytic stomata present on lower surface. Vascular bundle is present centrally.
Pharmacological Properties of Drug (Rasa Panchak)

Rasa of Prishnaparni is Madhura, Amla, Katu and Tikta. Its Guna is Laghu and Sara, Virya is Usna whereas Vipaka is Madhura.

Karma: Deepana, Sangrahi, Tridoshahara, Vataharah, Vrisya, Sothahara, Angamardaprasumana, Sandhanveya, Jeevaneeya, Balavardhaka.35

Phytochemical Constituents of Prishnaparni

Two isoflavones, 5,7-dihydroxy-2′-methoxy-3′, 4′-methyleneedioxyisoflavanones (2) and 4′, 5-dihydroxy-2′, 3′-dimethoxy-7-(5-hydroxyoxychromen-7yl)-isoflavonane(4) along with six known compounds including isoflavonone, triterpenes and steroids were isolated from roots of Uraria picta.26

Gambhari (Gmelina arborea)

Gambhari consists of dried fruit of Gmelina arborea Roxb. (Fam. Verbenaceae), an unarmed tree, found scattered in deciduous forests throughout the greater part of the country up to an altitude of 500 m, planted in gardens and also as an avenue tree.

Taxonomic Rank

Kingdom: Plantae; Division: Magnoliophyta; Class: Angiosperms; Order: Lamiales; Family: Verbinaceae; Genus: Gmelina; Species: G. arborea

Vernacular Names

Gambhari (in Hindi) Gomari (in Assamese) Gamargachha and Gambhar (in Bengali), Seevari (in Gujarati), Sevan, Shivani and Hannu (in Kannada), Kumbil and Kumizhu (in Malayalam), Sivan (in Marathi), Gambhari and Bhodarparni (in Oriya), Kambhari (in Punjabi), Perunkumiruch and Komizhpaizham (in Tamil), Gumaditeku (in Telugu), Gambhari (in Urdu).

Synonyms in Sanskrit

Kashmarya, Peetarohini, Sriparni, Bhdraparni, Madhuparnika, Krishnavrinda, Madhurasana, Mahakusumika, Tuvara

Botanical Description

Macroscopic

Fruit is drupe, ovoid, crinkled 1.5-2.0 cm long black in color, sometimes with portion of attached pedicle, one or two seeded, taste is sweetish sour. Seed is ovate, 0.5-1 cm long, 0.4-0.6 cm wide; light yellow in color with smooth, thin and papery surface.

Microscopic

Fruit has pericarp which is differentiated into single layered epicarp, multilayered, fleshy mesocarp and hard and stony endocarp. Epicarp consists of single layer, thin-walled cells whereas mesocarp has a wide zone of isodiametric, thin-walled, parenchymatous cells and endocarp consists of multilayered sclerenchymatous cells.

Seed has an outer integument consisting of 3-5 rows of crushed, parenchymatous cells followed by inner integument consisting of 2-3 rows of thin-walled, tangentially elongated, parenchymatous cells; cotyledons consisting of single layered, radially elongated epidermal cells. Mesophyll has thin-walled cells, filled with oilglobules and auleurone grains.

Pharmacological Properties of Drug (Rasa Panchak)

Rasa of Gambhari is Madhura, Amla, Kashya; Guna is Guru, Sara, Snigdha. It has Madhura Vipaka and Sheeta Virya.

Karma of Gambhari is shukrula, Hridya, Keshya, Medhya, Pittahara, Rasayana, Vatahara and Balya.22

Phytochemical Constituents of Gambhari

Butyric acid, Tartaric acid, Alkaloid, Resin and Saccharine.26

Swetachandana (Santalum album)

Swetachandana consists of dried heart wood of Santalum album Linn.of Family Santalaceae, an evergreen, semi parasitic tree, 8 to 18 m in height and 2 to 4 m in girth, widely distributed in the country, commonly found in the dry regions of peninsular India from Vindhya mountains outwards, especially in Karnataka and Tamil Nadu where it is cultivated for its aromatic wood and oil.

Taxonomic Rank

Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Santalales; Family: Santalaceae; Genus: Santalum; Species: album

Vernacular Names

Sandal Wood (in English), Chandan and Safed Chandan (in Hindi), Sandal Aayu (in Assame), Chandan (in Bengali), Sukhad (in Gujarati), Shirgandinahara, Shirgandha and Chand (in Kannada), Chandanam (in Malayalam), Chandan (in Marathi), Chandana marum, Sandanamandangam (in Tamil), Gandhap, Chekka, Manchei Gandham, Tella Chandanamand Sriga (in Telgu), Sandal Safed (in Urdu).

Synonyms in Sanskrit

Shrikhandha, Chamadrutti, Cha dan, Bhadrashree, Tailparnika, Gandhasara, Malayaj

Botanical Description

Macroscopic

Yellowish-brown to pale-reddish orange, heavy, dense, hard but split easily; transversely smooth surface shows alternating light and dark concentric zones with numerous pores, traversed by very fine medullary rays; odour, persistently aromatic; taste, slightly bitter.

Microscopic

Wood consists of tracheids, vessels, fibres, xylem parenchyma and traversed by medullary rays; vessels numerous scattered singly throughout the region, rarely two together, barrel-shaped, pitted and with transverse to oblique pen oration with tail-like projections, at one or both ends; a few tracheids elongated with tapering ends and possess bordered pits on their walls; fibres many, lignified with pointed tips; xylemparenchyma mostly rectangular, a few of them contain prismatic crystals of calciumoxalate; xylem rays numerous, run straight, uniseriate to triseriate, mostly biseriate, thick walled, radially elongated having golden yellow to brownish contents and contain a few prismatic crystals of calcium oxalate.

Phytochemical Constituents of Swetachandana

Volatile oil (α- and β- Santalol) composed of C10H20O, hydrocarbons like santene, nortricycle-ekasantalen; Aldehydes like nortricycle-ekasantalol 3, 7, 8 and acids alpha and beta santalic acids and alcohols like santonol, alpha santalol, beta santalol, teresantalol. Its leaf wax has hydropalmitone and palmitone.
Pharmacological Properties of Drug (Rasa Panchak)

Rasa of Chandan is Madhura, Tikta. It has Laghu, Ruksa Guna; sheeta Virya and Katu Vipaka.

Karma: Hridya, Krimighna, Kaphahara, Pittahara, Virshya, Varnya, Vishaagnha, Durgandhahara, Dahaprashhmana, Trishnanigrahana7.

DISCUSSION

The probable mode of action of Shalmali in the management of bleeding disorders can be explained by its action; done in previous clinical and experimental studies. Flowers of Bombax ceiba have shown anti proliferative and antioxidant activity against Cancer cell lines, COR-L23, C32, A375, ACHN, and LNCaP cells. Here its effect on cell growth inhibition is studied.29 The inhibitory effect of Bombax over cell growth may have regulatory effect in abnormal formation of layer of endometrium. Bombax malabaricum stem’s bark methanolic extract was found to exhibit a significant anti angiogenic activity on tube formation of Human Umbilical Venous Endothelial Cells (HUVEC). Lupeol a component of fractionated product of the extract showed a marked inhibitory activity on HUVEC tube formation while it did not affect the growth of tumor cell lines such as SK-MEL-2, A549 and B16-F10 melanoma.29 Shedding of endometrial wall following each menstrual cycle require angiogenesis for endometrial repair and regeneration. Any disruption in above mentioned process leads to menorrhagia which is manifested as excessive bleeding. Excess uterine bleeding is evidenced to be caused by abnormal excessive angiogenesis.30 Bombax, thus by anti angiogenic effect helps to check excessive uterine bleeding. The Mocha Rasa (Shalmali Niryas) contains tannic and gallic acids. They act as astringents and helps in restoring the damaged epithelial mucosal lining of the ulcerated mucosa.31,32 Fatty acid synthesis (FAS) had been found to be over expressive and hyperactive in most of proliferative diseases (like cancer). Pharmacological inhibitors of fatty acid synthesis activity preferentially repress cancer cell proliferation and induce cancer cell apoptosis without affecting non-malignant fibroblasts. These made Fatty acid synthesis an excellent drug target for cancer therapy. To test the inhibitory effort of flavonoid extracts of Shalmalia malabarica on FAS, cancer cell A549 was used as a cell model and was found effective.33 Thus, Shalmali show inhibitory effect on fatty acid synthesis which in turn limits proliferation of effected tissues of endometrium in abnormal uterine bleeding disorder.34

Similar effects are found in constituents of Santalum which shows action against any type of abnormal proliferation. The hydrolyzed exhausted sandalwood powder (HESP) has different properties including anti-remorogenic, anti-inflammatory, anti-mitotic, antiviral, anti-cancerous, anti-hypertensive, anti- pyretic, sedative, ganglionic blocking and insecticidal.35,36

For assessment of antitumor promoting activity about six novel sesquiterpenoids, two aromatic glycosides and several neolignans were identified from sandalwood heartwood chips, which were further evaluated for in-vitro Epstein-Barr virus early antigen (EBV-EA) activation in Raji cells. Later in vivo two-stage carcinogenesis assays were known to demonstrate its potent inhibitory effect on EBV-EA activation strong suppressive effect on two-stage carcinogenesis on mouse skin.37 Not only this, derivatives of α-santalol had shown tumor-selective cytotoxicity in HL-60 human promyelocytic leukemia cells and TIG-3 normal human diploid fibroblasts.38 Two lignans obtained from the heartwood samples, demonstrated apoptosis induced tumor cell cytotoxicity against HL-60 human promyelocytic leukemia cells and A549 human lung adenocarcinoma cells.39 Alpha-Santalol, an active component of sandalwood essential oil has been studied for skin cancer preventive efficacy in murine models of skin carcinogenesis.40 Santalum album possess anti-inflammatory and antitulcer activities evidence by significant inhibition in the carrageeann induced paw edema, cotton pellet induced granuloma, as well as pylorus ligation induced ulcer. The in-vitro antioxidant and in-vivo analgesic and anti-inflammatory activities in mice were established for methanolic extracts of heartwood.41

The above activity of individual drug when work in combination in a compound along with fortification of Ghrita and change in properties of compound during its processing can be assumed to be helpful in healing the eruptions caused by the inflammatory causes of excessive bleeding and checking new growth and proliferation.

CONCLUSION

Heavy menstrual bleeding poses undue mental stress and is sufficient enough to hamper physical activity of the woman. It can cause disruption in daily routine activities. Long term course of excessive heavy and prolong menstrual cycle can lead to life threatening condition. Untreated patients of HMB often suffer from severe anemia and its consequences. Abnormal Uterine Bleeding directly affects quality of life of suffering women and has a significant impact on physical and mental health.

Thus, the above-mentioned findings under the discussion of the individual drugs could substantiate the inclusion of this formulation in the effective management of Asrigdara (Abnormal uterine bleeding) in Ayurveda system of medicine.

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