



“A CLINICAL STUDY OF *DANTYADI GUTIKA* IN THE MANAGEMENT OF *ARTAVKSHAYA*.”

Dr.Yogita M. Choudhary¹, Dr.Veena A. Patil², Dr.Umesh Agavane³

¹P.G. Scholar, Prasuti Tantra and Streeroga, Government Ayurved College,
Tuljapur Road, Dharashiv, Maharashtra, India

²Guide & HOD, Prasuti Tantra and Streeroga, Government Ayurved College,
Tuljapur Road, Dharashiv, Maharashtra, India

³Assi. Professor Prasuti Tantra and Streeroga, Government Ayurved College,
Tuljapur Road, Dharashiv, Maharashtra, India

Abstract-

Background and Objectives- Normal menstruation represents the hormonal and gynaecological health of a female reproductive system, the hypothalamus pituitary ovarian axis, and other associated hormones control it. Ayurveda gives due importance to *Suddha Artava* and mentions that *Artava Dushti* is one of the causative factors for infertility. In the present era, this condition is highly prevalent in society. Keeping it under consideration this topic was taken up for the present study. Ayurveda suggests both *Vata Samak Dravyas* the line of treatment mentioned in *Yoga Ratnakara* were used here as the trial and control group to see and compare their efficacy in the management of *Artavakshaya*. **Methodology-** This research work was a randomized controlled clinical study of 80 patients suffering from the symptoms of *Artavakshaya* into 2 groups of 40 patients each. Group A was treated with *Dantyadi Gutika* for a period of 3 menstrual cycles and followed for 3 cycles. Group B was treated with *Rajahpravartini Vati* for a period of 3 menstrual cycles and followed for 3 cycles. **Result-**Clinical parameters were assessed statistically. Both groups showed statistically significant results. **Interpretation and conclusion** both *Dantyadi Gutika* are more effective than *Rajahpravartini vati* in the management of *Artavakshaya*

Keywords: *Artavakshaya; Artava Dushti, Dantyadi Gutika; Rajahpravartini Vati.*

INTRODUCTION

Normal menstruation represents the hormonal and gynecological health of a female reproductive system. It is controlled by the hypothalamus-pituitary ovarian axis and other associated hormones ⁽¹⁾ Ayurveda gives due importance to *Suddha Artava* and mentions that *Artava Dushti* is one of the causative factors for infertility ⁽²⁾. In Ayurveda, due importance is given to the health of the women because the health of the family, society, and nation largely depends on the health of its women. *Acharya Manu* has mentioned that women are the origin of progeny ⁽³⁾

Normal menstruation is that which has an interval between two menstrual cycles of one month, duration of menstrual bleeding of five days, not associated with pain or burning sensation. Artava should not be very scanty or excessive in amount ⁽⁴⁾. Artavakshaya is explained by Acharya Sushruta and is characterized by *yathochita kala adarshanam, alpartava* and *yonivedana* ⁽⁵⁾. It can be compared with oligomenorrhea and hypomenorrhea based on their signs and symptoms. Menstrual bleeding occurring more than 35 days apart and which remains constant at that frequency is called oligomenorrhoea. And when the menstrual bleeding is unduly scanty and

lasts for less than 2 days it is called hypomenorrhoea ⁽⁶⁾.

As *Artavakshaya* is the precursor of *nastartava* explained by *Sushrutacharya* and he explained that it is caused due to the involvement of *vata* and *kapha*, which will lead to *margavarodha* of *artavavaha srotas* which are also explained as the causes of *vandhyatwa* ⁽⁷⁾. and in the present era there is a high prevalence of this condition in society. Statistics say that out of 80.7% of women suffering from irregular menstrual cycles, 19.3% are suffering from oligomenorrhoea ⁽⁸⁾. so, this topic was undertaken for the present study. For the treatment of *artavakshaya*, *Sushrutacharya* has explained that *shodhana* and *agneyachikitsa* should be done ⁽⁹⁾. In our classics, various *yogas* have been explained.

In *Dantyadi gutika* most of the contents have properties of *Agneya Dravya Ushna, Tikсна*, etc. Due to its *vatakaphahara* and *pittavardhana* properties, it can be used in *Artavakshaya* it removes *Avrodha* which is present in *srotas*. It is *Rudhistravakarini* so useful in *Artavakshaya*. Hence, I decided to give *Dantyadi Gutika* in Group A and *Rajahpravartini Vati* in Group B patients to know the efficacy of both drugs in *Artavakshaya*.

Objectives of the study:

- a) To evaluate the efficacy of *Dantyadi Gutika* and *Rajahpravartini Vati* in the management of *Artavakshaya*.

Materials and Methods-

Selection of patients:

1. A minimum of 80 patients diagnosed with *Artavakshaya* attending *Prasuti Tantra* and *Stree Roga* OPD of Government Ayurvedic Hospital Dharashiv.
2. Other available sources were selected for the present study.

Selection of drug

Dantyadi Gutika explained in *Yoga Ratnakara* consists of *Dantimoola*, *Hingu*, *Yavakshara*, *Katutumbi*, *Pipalli*, *Guda*, and *Snuhikshira*, these were identified, selected, and confirmed by the *Dravyaguna* department after they were bought from the local market. *Gutika* was prepared in *Rasa Shastra* and *Bhaishjya Kalpana* Laboratory, Government Ayurvedic College, Dharashiv as per the references given in classical texts.

Method of data collection:

- 80 Patients suffering from *Artavakshaya* were selected based on diagnostic, inclusion, and exclusion criteria. Treatment is done then for 3 menstrual cycles.
- **Group A** (Trial group) was treated with *Dantyadi Gutika* 500mg with *koshna jala* twice a day before a meal from the 5th day of the menstrual cycle for 15 days for 3 menstrual cycles.
- **Group B** (Control group) was treated with *Rajahpravartini Vati* 250 mg with *koshna jala* twice a day before a meal from the 5th day of the menstrual cycle for 15 days for 3 menstrual cycles.

Follow-up: On the 3rd day of the menstrual cycle after completion of treatment for 3 cycles.

Statistical test – Wilcoxon Signed Rank test.

Diagnostic criteria:

Diagnosis was based upon the presence of any one or more of the following criteria.

- A. *Yathochitakala Adarshanam* of ArtavaMenstrual cycle > 35 days
- B. *Alpartavam* –
 - a) Duration of bleeding < 2 days
 - b) Decrease in quantity of bleeding

C. Yoni Vedana - Pain during menstruation

Inclusion criteria:

1. Patients of age group 18 to 35 years.
2. Both married and unmarried women.
3. Patients having *Artavkshaya lakshanas* by Acharya Sushruta i.e., *Yathochitakala Adarshanama, Alpata* and *Yonivedana*
4. Nulliparous or parous women having a maximum of 3 deliveries through the vagina.
5. Patients not having any acute infection or any systemic major disease.

Exclusion criteria:

1. Patients of age below 18 and above 35 years.
2. Patients having gross abnormalities of the uterus & surgically curable disease.
3. Patients having primary amenorrhea.
4. Within 3 years from menarche.
5. Other major systemic diseases, chronic illness,
6. Patient with severe anemia (Hb<9 gm%)
7. H.I.V. / HBsAg positive.
8. Pregnant, lactating mother, perimenopausal woman

Withdrawal criteria:

1. The patient refused to continue with the treatment.
2. The patient developed any adverse effects.
3. The patient didn't maintain proper follow-up.
4. The patient migrated to another place.

Investigation:

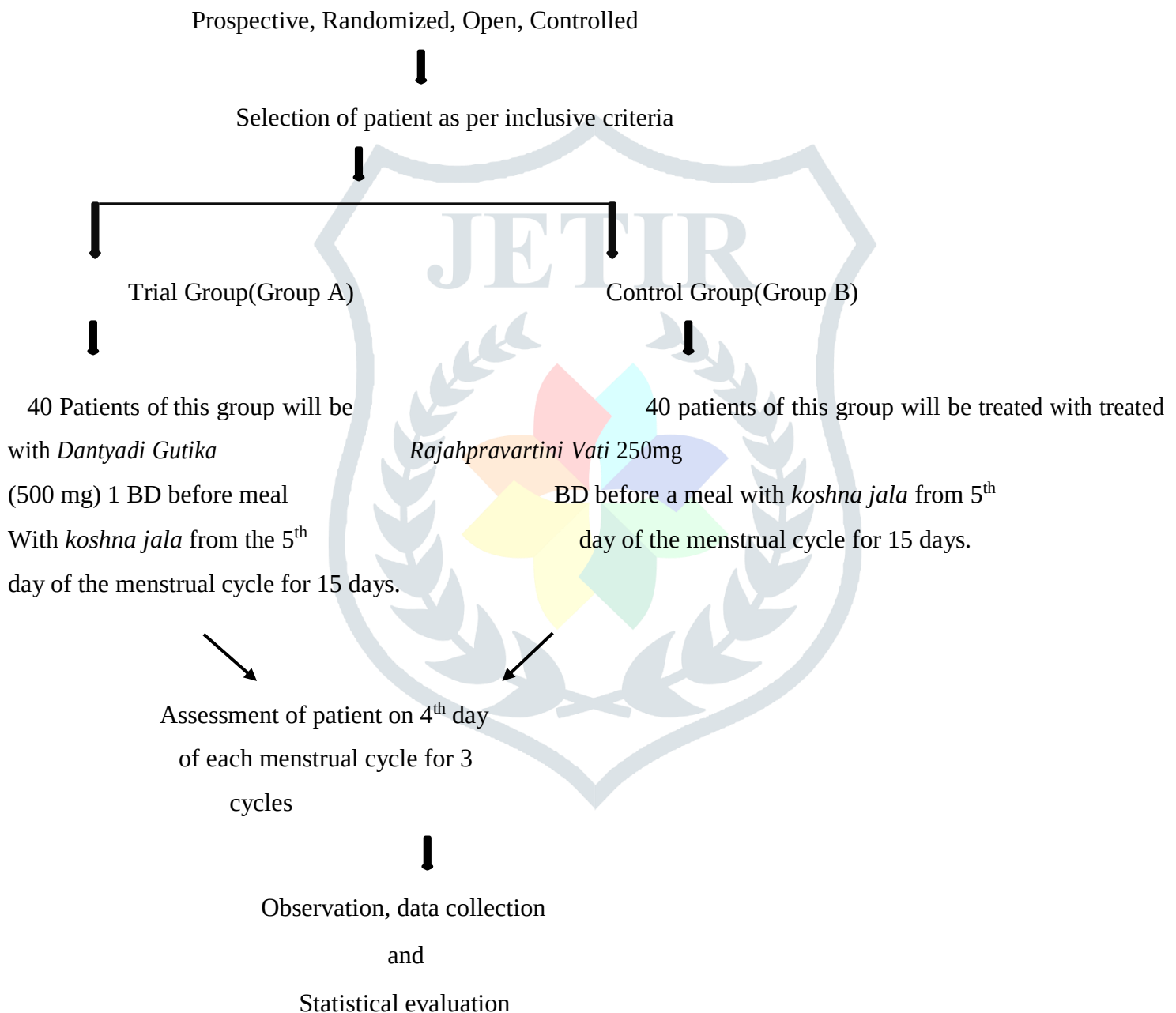
1. Hematological investigations like Hb%.
2. HIV/HBsAg

3. USG- Abdomen & pelvis.

Before and after treatment on the 5th day of the menstrual cycle to know endometrial thickness & other pathology.

4. Other investigations if necessary.

Study Plan



CLINICAL CRITERIA FOR ASSESSMENT:**Subjective Criteria****Table no. 1** - Duration of Menstrual blood flow grading

DAYS	SCORE
3-5	0
<3	1
<2	2
<1	3

Table No.2 The interval between 2 Menstrual cycle

INTERVAL OF BLEEDING	SCORE
24 – 34 days	0
35 - 39 days	1
40 - 45 days	2
Above 45 days	3

Table No.3 Pain during Menstrual cycle

GRADE OF PAIN	SCORE
No Pain	0
Mild Pain – menstruation is painful but daily activities not affected	1
Moderate Pain – daily activities are affected	2
Severe Pain – daily activities are affected & pain is continuous	3

Table no. 4- Amount of Menstrual bleeding grading

PADS/DAY	SCORE
3	0
2	1
1	2
Only Spotting	3

RESULTS:**Statistical Analysis: In Group A and Group B Subjective Parameters****(By Wilcoxon Signed Ranks Test)****A) Amount of Bleeding:****Table No.5:** Statistical Analysis of Amount of Bleeding of 80 patients of *Artavakshaya*

Group	Day	N	Mean	SD	W	P
Group A	BT	40	1.6	0.744	0	< .00001
	AT	40	0.325	0.474		
Group B	BT	40	1.35	0.622	0	< .00001
	AT	40	0.375	0.490		

In Group A, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded that the Amount of Bleeding has decreased significantly.

In Group B, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded Amount of Bleeding is decreased significantly.

B) Duration of Bleeding:**Table No. 6:** Statistical Analysis of Duration of Bleeding of 80 patients of *Artavakshaya*

Group	Day	N	Mean	SD	W	P
Group A	BT	40	1.65	0.975	0	< .00001
	AT	40	0.325	0.474		
Group B	BT	40	1.325	0.828	137	< .00001
	AT	40	0.35	0.533		

In Group A, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded that Duration of Bleeding is decreased significantly.

In Group B, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded Duration of Bleeding is decreased significantly.

C) Interval between two M. C.:**Table No. 7 –** Statistical Analysis of Interval between 2 M.C. of 80 patients of *Artavakshaya*

Group	Day	N	Mean	SD	W	P
Group A	BT	40	1.75	0.869	0	< .00001
	AT	40	0.4	0.496		
Group B	BT	40	1.9	0.810	0	< .05
	AT	40	0.575	0.594		

In Group A, the value of p is less than 0.05, a significant difference was observed between BT and AT mean. Hence it is concluded that the Interval between two M. C. is decreased significantly.

In Group B, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded Interval between two M. C. is decreased significantly.

D) Pain during M. C.:**Table no. 8** – Statistical Analysis of Pain during M.C. of 80 patients of *Artavakshaya*

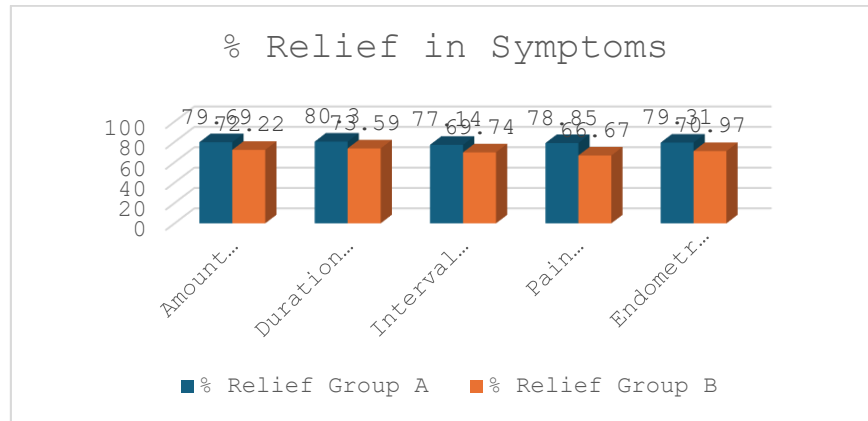
Group	Day	N	Mean	SD	W	P
Group A	BT	40	1.3	0.853	0	< .00001
	AT	40	0.275	0.452		
Group B	BT	40	1.275	0.751	98	< .00001
	AT	40	0.425	0.501		

In Group A, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded that Pain during M. C. is decreased significantly.

In Group B, value of p is less than 0.05, significant difference was observed between BT and AT mean. Hence it is concluded Pain during M. C. is decreased significantly.

Effect of therapy**According to % Relief in Symptoms****Table No.9:** % Relief in Symptoms of both groups

Sr. No.	Symptoms	% Relief	
		Group A	Group B
1	Amount of Bleeding	79.69	72.22
2	Duration of Bleeding	80.30	73.59
3	The interval between two M. C.	77.14	69.74
4	Pain during M. C.	78.85	66.67
5	Endometrial Thickness	79.31	70.97
6	Avg. % Relief	79.06	70.64

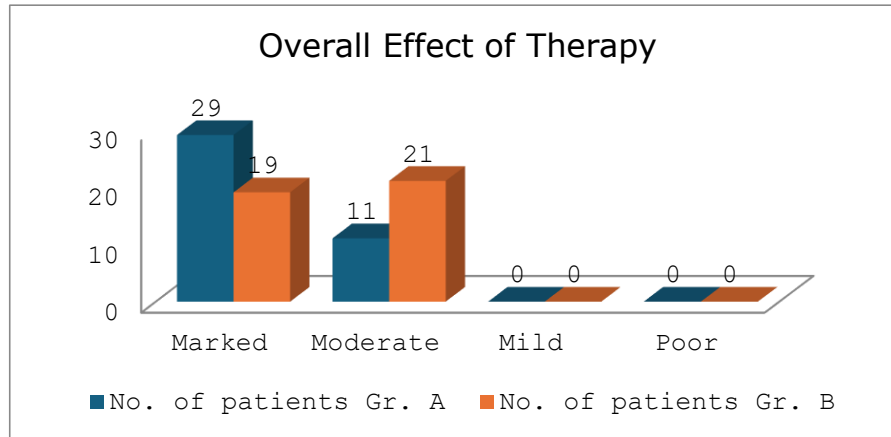
Graph no.1 – Symptom-wise effect of therapy.

Average % Relief in Group A is 79.55% and % of Relief in Group B is 70.65%

Overall Effect of Therapy

Table no.10 - Overall Assessment criteria

Sr. No.	Criteria	Improvement Grade	No. of patients	
			Gr. A	Gr. B
1	75% to 100%	Marked	29	19
2	50% to 74%	Moderate	11	21
3	25% to 49%	Mild	00	00
4	00% to 24%	Poor	00	00

Graph no. 2–Overall effect of therapy in both groups

In group A, 29 patients have shown marked improvement and 11 patients have shown moderate improvement.

In group B, 19 patients have shown marked improvement and 21 patients have shown moderate improvement.

DISCUSSION

Artavakshaya is one of the menstrual disorders which indicate scanty menstrual flow associated

with pain in variable duration where vitiation of *vata* and *kapha* are predominant. As we all know *artava* is formed from *rasa dhatu* within a month after proper metabolism of *rasa dhatu* by its

dhatwagni and *bhutagni*. The *kshaya* of *rasa dhatu* cause *artavakshaya* and *raktakshaya* will develop simultaneously. As stated above *artava* and *rakta* are interlinked due to the same *utpattisrota* i.e. *rasa dhatu* and the same nature i.e. *agneya*. Therefore *artavakshaya* may also develop due to *raktakshaya*. Maharshi Sushruta has mentioned that *artava* is *agneya* and in *artavakshaya*, there is the reduction of *agneyaguna* of body i.e. *pitta kshaya* will take place, and *vruddhi* of *vata* and *kapha* will be there. As in our classics *artavakshaya* has not explained as a separate disease, but it has been explained as a symptom for many of the *yoni vyapad* and *artavadushti*. Acharya Sushruta explained *artavakshaya* in *doshadhatu mala kshayavruddhivigyanam* in *sutrasthana*.

Samprapti-

□ Vitiation of *Dosha* takes place along with *Agnimandya*, due to *Dosha dusti karaa hara* and *vi-*

hara, because of which proper digestion of *ahara* does not take place which leads to the production of *dushitaahara rasa* and *ama*. It will further produce *dushita rasa dhatu*. Subsequently, there is vitiation of *samanavayu*, *pachaka pitta*, and *kledakakapha* due to *jatharagnimandya*.

□ *Vikrutakapha* obstructs the *marga* of *apanavayu* and hence *karmahani* of *vata* take place resulting in a reduced flow of *artava*. In this condition, the *vrudhakapha* (*avaraka*) symptoms become predominant and there is decreased activity of *vata* (*avruta*) which is expressed. Hence there is *kapha* aggravation and diminution *pitta dosha* in quality, which further leads to *jatharagni-mandya* and finally *kshaya* of *rasa* and *rakta* that take place leading to *artavakshaya*.

□ *Artavavahasrotasa* are obstructed by the *vikruta apanavayu* and *kapha* which leads to *artavakshaya*.

Possible process of manifestations-

1. The formation of *artava*, where the role of *prakruta rasa dhatu* and *prakruta Kapha dosha* is involved is affected, due to which *ritukala* is prolonged i.e. *yathochita kala adarshanam* of *artava* take place.
2. Due to obstruction of *apanavayu*, the *artava pravrutti* will not take place at its proper time as *artava pravrutti* is the *karma* of *apanavayu*.
3. Due to *kshaya* of *pitta*, the *artavapramana* is decreased. The function of *apanavayu* to excrete. they formed *artava* in proper quantity is hampered resulting in scanty menstruation that is *alpartavam* develops as a symptom in *artavakshaya*.
4. *Yoni vedana* results due to improper evacuation of *artava* which is caused by improper action of *apanavayu*.

Chikitsasidhanta-

□ The management should be to correct the pathology i.e. *samprativighatanamevachikitsa* should be adopted. The correction should be in such a way as to remove the *margavarodha* from the *artavavahasrotasa* by breaking the *avarana* and *agnideepana* which in turn results in the proper function of *rasa* and *rakta dhatu*, and leads to *artavavruddhi*.

□ In classics both *shodhana* and *shaman chikitsa*

have been mentioned for *artavakshaya*. *Acharya-Dalhana* has explained that for *shodhana*

karma, *vamana* should be done as it will remove only *saumya dhatu* and increase the *pitta* which will lead to *artavavruddhi*. For *shamanachikitsa*, *agneya dravyas* should be used which will improve the *agni* as well as *pitta* and in turn increase the *artava* and help in *vatanulomana*.

□ Thus *vata*, *pitta*, and *kaphadosha* should be brought to normalcy to perform their respective

function during *rituchakra* thereby establishing the normal *artavapravrutti*. Hence in this context, *agneyadravyas* are very relevant.

□ The use of *agneyadravyas* not only relieves the kapha which does *avarana* to *apanavayu* but also increases the quantity of artava. As *agneyadravya* have *ushnavirya*, it maintains the normal *ruksha* and *sheetaguna* of *vayu*, *snigdha* *picchil* *aguna* of *kapha*.

□ There are many *agneya* drugs mentioned in *Aurveda* which are having *artavajanana* property

Dantyadi Gutika is one among them which was the trial drug in this study.

DISCUSSION ON THE DRUG REVIEW

DANTYADI GUTIKA

The trial drug *Dantyadi Gutika* explained in *Yoga Ratnakara* contains *dantimoola*, *hingu*, *katutumbi*, *yavakshara*, *pippali*, *puranguda* and *snuhiksheera* for *Mardan*. This given to the patients suffering from *artavakshaya* is said to give the ultimate effect on *artavavahasrotasa*.

Most of the contents of the drug are said to be *agneyadravyas* and have *garbhashayasankochaka* properties. Hence it will directly act on *artavakshaya*.

Artavajanakadravya are the substances that enhance the amount of menstrual blood and also regularize the menstrual cycle. *Artava* is said to be *agneya*, hence the drugs need to be attributed with *Katu rasa*, *tikshnaguna*, *ushnavirya* called as *artavajanaka dravyas*.

The use of *agneya dravyas* relieves the *Kapha* which has done the *Avarana* of the *apana vayu* by blocking the *artavavaha srotasa* and thereby removing the *marga-varodha* and also increases the quantity of *artava*. These *dravyas* increase the amount of menstrual flow by improving the vascular supply or by increasing the thickness of the endometrium.

Most of the ingredients in *Dantyadi Gutika* have *katu rasa*, *tikshnaguna*, *ushnavirya* and *katuvipaka* *kaphavatashamana* property and *pittavardhaka shulaprashamana*, *deepana* and *pachana* properties.

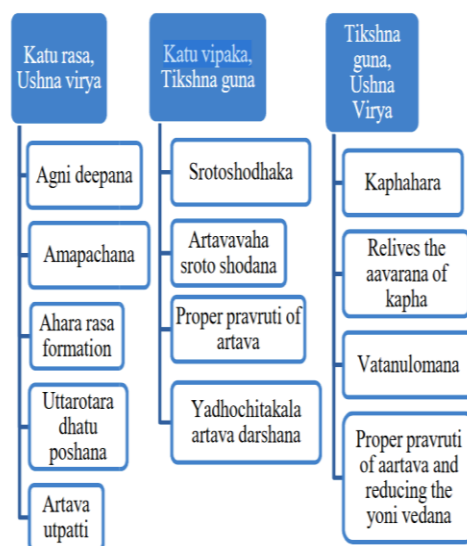
Probable Mode of Action of Drug:

Most of the ingredients in *Dantyadi Gutika* have *katu rasa*, *tikshnaguna*, *ushnavirya* and *katuvipaka* *kaphavatashamana* property and *pittavardhaka shulaprashamana*, *deepana* and *pachana* properties

Table no. 11 containt,*ras,guna,virya,vipaka,karm* of *Dantyadi Gutika*

Chart No.1 Mode of action of *DantiyadiGutika* and *Samprapti* *Vighatana*

S R N O	DRAVYA	RASA	VIRYA	VIPAK A	GUNA	KARMA
1	DANTIMO OLA	Kat u	Us hna	Kat u	Ushna, Tiksna	Kaphavatahara,Rechana, Deepana
2	HINGU	Katu	Ushna	Katu	Laghu, Snigdha, Tiksna	Kaphavatshamaka, Pittavardhaka,
3	YAVKSHAR	Katu	Ushna	Katu	Sukshma, Tikshna	Kaphavatahara
4	ALABUBE EJ	Tikt a	She eta	Kat u	Laghu, Ruksha	Kaphapittahara, raktashodhak Shothahara
5	SNUHIKS HEER	Kat u	Us hna	Kat u	Laghu, Snigdha, Tikshna	Kaphavatshamaka, Deepana, Rechana,
6	PIPPALI	Katu	Anush nashee ta	Madhur	Laghu, Snigdha, Tikshna	Kaphavatahara, Deepana,Rasayana
7	PURANGUDA	Madhur	Ushna	Madhur	Snighdha, Guru	Pittavardhaka, Agnideepana



Agneyadravya-

As almost all the *dravyas* of *Dantiyadi Gutika agneya* in nature and have *agnideepana*

Property, proper *pachana* of *ahara* take place leads to the formation of proper *ahara rasa* and then *dhatu* therefore normal *utpatti* and *pravrutti* of *artava* occurred due to the use of this yoga the drugs had *kaphavatahara* and pitta *vardhakaproperties* helped in relieving the *kaphaavarana* of *apanavayu* and further *prakrutagati* of *apanavayu* which helped in normal *pravrutti* of *artava* without any pain.

Mode of action According to modern

□ Drugs like *katutumbi*, *hingu*, *pippali* and *Snuhiksheera* have antihyperglycemic properties Studies show that the use of anti-diabetic drugs helps in ovulation which results in corpus

luteum formation and maintains the normal HPO balance and hence helps in regularising the menstrual cycle.

□ Most of the drugs have antioxidant properties that help in maintaining the proper estrogen production, ovulation, and maintaining the luteal phase. Antioxidants also increase the anabolic activity in the body hence increasing the thickness of the endometrium increasing the amount of blood flow.

Most of the drugs possess antispasmodic, carminative and antiinflammatory property which helps in relieving the pain during menstruation.

Most of the drugs have minerals, vitamins, car-bohyrates, proteins which helped in improving the general health of the patients along with helping in the good metabolism and therefore maintain the normal hormonal balance in the body which are responsible for normal menstruation.

Thus *Dantyadi Gutika* fulfils all the criteria that are needed for the management of *Artavkshaya*

Rajahpravartini Vati

Mode of action of *Rajahpravartini Vati*:

Rajah Pravartini Vati as given in BHAISHAJYA RATNAVALI is USHNA (Hot)

potency. Ingredients in it are Elwa (Musabbar) – Aloe Vera (Indian Aloe) Extract 1 Part

Roasted Hing (Asafoetida) – FerulaAssa-Foetida) 1 Part

Shuddha Tankan (Tankan Bhasma) 1 Part

Shuddha Kasis (or KasisBhasma) 1 Part

Bhaishajya Ratnavali, Chapter 67, *Yonivyapad*, Verse 58-60

All ingredients in it are potent emmenagogue action and promote the menstrual flow by re-leasing the flow obstruction in menstruation due to increased *Kapha* and aggravated *Vata*. It pacifies *Kapha Dosha* and *Vata Dosha*, but it increases *Pitta Dosha*.

CONCLUSION:

a)The main principles of management of *Artavak-shaya* is *Agnivardhaka*, *Vata kapha shamaka* and *Vatanulomaka Chikitsa*. In classics, both *Shodhana* and *Shaman Chikitsa* are described. *Shamana Chikitsa* is done by using the *AgneyaDravya* which improves the *Artavautpatti* by“*Samanena Samanasya Vruddhi*”.

b) *Arthavjanya* drugs and drugs having Phytoestrogen, rich in antioxidants can give better results in treating *Arthavakshaya*.

c) On the interval between two menstrual cycles both the drugs were statistically highly significant cant, where Group A drug effectiveness was found to be 7.4% more than Group B drug.

d) On duration of menstruation both the drugs were statistically highly significant, where Group drug effectiveness was found to be 6.7% more than Group B

e) On the amount of blood flow both the drugs were statistically highly significant, where Group A drug effectiveness was found to be 7.4 % more than the Group B drug.

f) On pain during menstruation both drugs were statistically highly significant, whereas Group B drug effectiveness was found to be 12.2% more than Group A.

g) Hence both drugs were statistically significant in *Artavakshaya* and statistically *Dantyadi Gutika* is more effective in all the criteria.

REFERENCES

1. D.C. Dutta, D.C Dutta's Text book of Gynaecology including contraception, Edited by HiralKonar Edition -6, New central book agency, Kolkata, Reprinted -2009, Chapter 8, Page No -79
2. Sushruta, Sushruta Samhita, Ayurvedtatvasandipika by Dr. Ambikadatta Shastri, published by Chaukhambha Sanskrit sansthan, Varanasi, reprinted in 2012, Sharirsthana- Chapter- 2, Sloka- 5, Page No.-12
3. Maitreyee Deshpande, Manusmriti, With Kullukbhatta Commentary, Vol- 2, First edition, New Bhartiya Book Corporation, Delhi, Reprint 2010, Chapter-9, Sloka- 96, Page No.- 601
4. Agnivesha, Chakrapanidatta, Charaka Samhita Revised By Charaka And Dridhbala With Ayurveda Dipika Commentary, Edited By Vaidya Jadavaji Trikamji Acharya, Chaukhambha Orientalia, Varanasi, Reprint Edition-2011, Chikitsa Sthana, Chapter-30, Sloka No.- 225-226, Page No.- 643.
5. Sushruta, Dalhanacharya, Sushruta Samhita With Nibandhasangraha Commentary, Vaidya Jadavji Trikamji Acharya, Chaukhambha Orientalia, Varanasi, Reprint Edition-2014, Sutra Sthana, Chapter- 15, Sloka No.- 12, Page No.- 70.
6. D.C. Dutta, D.C Dutta's Text book of Gynaecology including contraception, edited by HiralKonar, Edition-6, New central book agency, Kolkata, Reprinted-2009, Chapter-14, Page No.- 179
7. Sushruta, Dalhanacharya, Sushruta Samhita With Nibandhasangraha Commentary, Vaidya Jadavji Trikamji Acharya, Chaukhambha Orientalia, Varanasi, Reprint Edition 2014, Sharira Sthana, Chapter-2, Sloka No.- 21, Page No.- 346.
8. <http://www.emro.who.int/emhj-volume-18-2012/issue-4/article-07.html>,
<http://onlinelibrary.wiley.com/doi/10.1111/j.1471-0528.2004.00012.x/full>
9. Sushruta, Dalhanacharya, Sushruta Samhita with Nibandhasangraha Commentary, Vaidya Jadavji Trikamji Acharya, Chaukhambha Orientalia, Varanasi, Reprint Edition-2014, Sutra Sthana, Chapter- 15, Sloka No.- 12, Page No.- 70.
10. Maharshi Sushruta, Sushruta Samhita with Nibandha Sangraha commentary of Shri Dalhana Acharya and Nyaya Chandrika Panjika of Gayadasa Acharya, Edited by Yadavji Trikamji Acharya, Sharir Sthana, adhyaya 2, Shukrashonitashuddhisharira/21, Varanasi: Chaukhamba Surbharati Prakashan; Edition reprint, 2003, pg. 346.

(2) Shastri A., Garbhavkrantisharir, Sushruta Samhita, Sharirsthan 3/2, Chaukhambha Publications, Reprint 2014; Vol.(1):p.25.

6) Laxmipati Shashtri ,Yogratnakar Vidyotini Hindi Tika sahit , , Raktagulma *chikitsa*, Choukhamba Sanskrit series office Banaras 1955 p.522

