

EFFECT OF AYURVEDA INTERVENTION ON DEL CASTILLO SYNDROME: A CASE REPORT

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Abstract

Sertoli cell only syndrome, one of the rarest contributing causes for infertility in men, is characterized by Azoospermia. This condition is one of the commonest causes for Azoospermia as well. The prevalence ranges from 5% to 10% or less of all infertile men. Ayurveda has multidimensional approach in managing infertility in males and this case report highlights the effectiveness of one such case treated with Virechana, Basti, and Uttara Basti along with Shamanoushadhi.

Patient information

A 40-year-old male presented to the outpatient department with complaints of inability to conceive from past 8 years of marriage. This condition was diagnosed as beejopagataja klaibya based on signs and symptoms.

Therapeutic interventions:

Patient was treated with different Ayurvedic external and internal therapies in the span of 32 weeks Consecutively administered with Virechana with Madhyama Shuddhi, Rajayapana basti, Vrishya basti and Uttara Basti was administered. Clinical assessment of seminal analysis was done on both pre and post treatment.

Results:

In this study, a comprehensive therapeutic intervention using Ayurveda medications and therapeutic procedures such as Virechana, Basti, and Uttarbasti was found to be effective in regeneration of sperm cells (5 million) which are active, motile, and healthy.

Conclusion:

This study demonstrates the effectiveness of ayurvedic management comprising of both internal and external therapies in the treatment of beejopagata klaibya. A marked improvement in sperm cells was noted. No adverse events were noted during the treatment period or throughout follow up.

Key words: beejopagataja klaibya, Sertoli cell sperm cell, virechana, basti, uttarabasti

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Introduction:

Infertility is considered a major public health issue of recent decades and affects about 15% of couples trying to conceive¹. Approximately 50% of infertility cases are caused by a male factor that often caused by spermatogenesis failures, problems related to sperm quality (morphology and or motility), and a reduced number of spermatozoa in the semen². Azoospermia, the complete absence of sperm in the ejaculate, is a more severe form of male infertility occurring in 10–15% of males seeking medical care for infertility³. Azoospermia can be classified as obstructive azoospermia (OA) and nonobstructive azoospermia (NOA). OA results from any obstruction along the male reproductive tract that prevents spermatozoa to reach the

ejaculate, while NOA is characterized by severely impaired spermatogenesis due to endogenous or exogenous abnormalities. Based on histological evaluation of the testicular biopsy, NOA is classified into hypo spermatogenesis (HS), maturation arrest (MA), and Sertoli cell only syndrome (SCOS)⁴. The prevalence of SCOS in azoospermia patients has been reported about 26.3–57.8%⁵. There are various aetiologies of human SCOS, which include Y chromosome microdeletions, chromosome disorders, undescended testis, radiation, cytotoxic drugs, and virus infection⁶. However, the causes of it have not been fully understood. SCOS is also known as germ cell aplasia and Del Castillo syndrome, which is characterized by azoospermia in which the seminiferous tubules of testicular biopsy

samples are lined only with Sertoli cells. SCOS was characterized by the total absence of germ cells, Sertoli cells with a normal cytoplasm within seminiferous tubules, lack of histological degeneration in the testes, and reduced testicular volume with normal secondary sexual characteristics. The focal and complete SCOS is the two types of this disorder. The focal SCOS is characterized by residual areas of normal spermatogenesis within the testis. On the other hand, complete SCOS is identified with gonocytes that lose their way during migration to the embryonic gonads and non-formation of their germinal epithelium⁷.

In Ayurvedic parlance, the complete absence of germ cells and consequent azoospermia observed in Sertoli-cell-only syndrome can be correlated with *Beejopagataja klaibya*⁸. Acharya Acharya Charaka enumerates *Beejopagataja klaibya* among the four types of *klaibya* (sterility) and attributes it to qualitative and quantitative depletion of *Shukra* (*beeja*) caused by *vata* predominance, *dhatu-kshaya* (tissue depletion) and improper diet–lifestyle factors⁹. Sushruta emphasises that purity and integrity of *Shukra* (semen) is indispensable for the production of healthy progeny; any severe vitiation or absence of Semen results in infertility.

The management protocol for such conditions therefore centres on *shodhana*¹⁰, particularly *Virechana* to clear *srotorodha* and pacify *vata-pitta*, followed by *Yapana basti*, *Uttara basti*¹¹ and *vajikarana-rasayana*¹² therapies that replenish *Shukra*, *mamsa* and *bala*. Accordingly, the present case of Del Castillo syndrome was managed on the lines of *Beejopagataja klaibya* with *Virechana*¹³, *Yapana basti* and supportive *Shamanoushadhi*.

Patient information:

A 40-year-old male patient presented to a tertiary care hospital in Udupi on 20/04/2025 with complaints of inability to conceive for 8 years with latest FNAC report dated 25/2/25 showing azoospermia, Sertoli cell only syndrome. On detailed history inability to conceive for 7 years despite of unprotected coitus with no history of any systemic or psychiatric illness. The couple reported no other symptoms or illness.

Clinical findings:

The patient was afebrile with pulse rate of 74/min, respiratory rate was 16/min and with blood pressure was 130/70 mm of hg. No abnormality was noted after the detailed systemic examination. Appetite micturition sleep and bowel habits were normal. The patient was moderately built belonged to *Vatapitha prakriti*.

Local examination

On Inspection:

The scrotum is inspected in standing and supine positions. No visible scars, sinuses, or skin changes are present. Penis is uncircumcised, normal in size

and morphology with no hypospadias, epispadias, or urethral discharge.

Palpation:

On palpation in the standing position, dilated, tortuous veins of the pampiniform plexus are palpable bilaterally, confirming bilateral varicocele. Both testes are palpable within the scrotum. Testicular consistency is soft. Testicular volume is reduced bilaterally, showing bilateral testicular atrophy with size of 2.7 cm each. Epididymis is normal and palpable without nodularity or tenderness. Spermatic cord is thickened due to dilated veins. No inguinal hernia is detected on cough impulse.

Timeline

The patient had been married for 8 years. Just after marriage, the couple tried for conception, but they failed. For which they consulted various conventional methods during which, the patient was advised with multiple medications throughout course with multiple semen analysis which showed azoospermia later patient was advised for FNAC and USG which revealed SCOS, bilateral varicocele grade I on right side and grade 2 left side on 25/2/25. The patient came for Ayurvedic treatment on April 10, 2025 and the treatment was continued till December 12, 2025. The total duration of the treatment was 32 weeks.

Diagnostic assessment

Histopathological confirmation via FNAC established Sertoli cell-only syndrome of the left testis. Sonological assessment demonstrated bilateral testicular hypotrophy testicular length of 2.4 cm, and 2.2cm accompanied by varicocele graded I on the right and II on the left as per the Dubin and Amelar classification. Semen analysis report suggestive of azoospermia on 08/09/25.

Therapeutic interventions:

The subject underwent Panchakarma-based therapy after baseline assessment. The schedule commenced with *deepana-pachana*, followed by *snehapana*, *abhyanga-swedana*, and *virechana*, which produced 13 vegas (bouts) and was managed with stage-specific *samsarjana krama*. Subsequently, a *kala basti* regimen comprising two cycles of *rajayapana basti* and two cycles of *vrishya yapana basti* was administered, each cycle spanning 8 days (gap of *virechana* and *basti*). The protocol incorporated *anuvasana basti* and *niruha basti* in alternation. *Uttara basti* with *Ashwagandha taila* was given as an adjuvant to enhance *shukra dhatu* and local tissue integrity. The therapeutic details are presented in table.1

Oral medications:

The subject received oral administration of polyherbal and herbo-mineral formulations for 8 months. The selection of drugs, enumerated in Table 2

Table 1: Schedule of the therapies with duration

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Date	PRODECUR E	MEDICINE	DOS E	DURATION AND TOA
10/04/25	Deepana	Agnitundi vati	2- 2-2 b/f	3 days
12/04/25	pachana	Citrakadi vati	2-2-2 b/f	
13/04/25	Snehapana	Kalyankagrita	Day 1 50 ml	5 days
17/04/25			D2 100 ml	
			D3 150 ml	
			D4 225 ml	
			D5- 270 ml	
18/04/25	Sarvanga	Maha Narayana taila	Quantity sufficient	3days
20/04/25	abhyanga	Dasamula		
20/04/25	Swedana	kwatha		
20/04/25	Virechana	Trivruth lehya	50 gms with 100 ml of warm milk	1 day
Till 23/04/25	Samsarjana karma	Post therapy dietary regimen	-	4 days
13/07/2025		Rajayapana basti course		
	D1- matra basti	Ashwagandha taila	60ml	Afternoon After food
	D2 niruha basti	Rajayapana basti	450ml	Early morning 6 am
	D3 matra basti	Ashwagandha taila	60ml	Afternoon After food
	D4 niruha basti	Rajayapana basti	450ml	Early morning 6 am
	D5 matra basti	Ashwagandha taila	60ml	Afternoon After food

D6 niruha basti	Rajayapana basti	450ml	Early morning 6 am
D7 matra basti	Ashwagandha taila	60ml	Afternoon After food
D8 matra basti	Ashwagandha taila	60ml	After noon After food

Patient was advised to continue oral medications for 2 months followed by vrushya yapana basti

Date	PROCEDURE	MEDICINE	DOS E	DURATION AND TOA
	Vrushya yapana basti course			
17/09/2025	D1 - matra basti	Balaashwagandha taila	60 ml	After noon After food
	D2- vrushya yapana basti		45 0 ml	Early morning 6 am
	D3 matra basti	Balaashwagandha taila	60 ml	After noon After food
	D4 vrushya yapana basti		45 0 ml	Early morning 6 am
	D5 uttara basti	Balaashwagandha taila	60 ml	After noon After food
	D6 vrushya basti		45 0 ml	Early morning after food
	D7 - uttara basti	Balaashwagandha taila	60 ml	After noon After food
	D8 matra basti	Balaashwagandha taila	60 ml	Afternoon After food
24/12/25	Vrushya yapana basti course			

D1	- Balaashw	60	After
matra	agandhadi	ml	noon
basti	taila		After
			food
D2-		45	Early
vrushya		0	morni
yapana		ml	ng 6
basti			am
D3	Balaashw	60	After
matra	agandhadi	ml	noon
basti	taila		After
			food
D4		45	Early
vrushya		0	morni
yapana		ml	ng 6
basti			am
D5	Balaashw	60	After
uttara	agandhadi	ml	noon
basti	taila		After
			food
D6		45	Early
vrushya		0	morni
basti		ml	ng
			after
			food
D7	- Balaashw	60	After
uttara	agandhadi	ml	noon
basti	taila		After
			food
D8	Bala	60	Aftern
matra	ashwagan	ml	oon -
basti	dhadi taila		after
			food

FOLLOW-UP AND OUTCOME

Semen analysis was done after the completion of 8 months of treatment. Analysis findings dated dec 2025 showed sperm cells with 20 % active over a count of 3 million [Figures 1 and 2]. There was no adverse or unanticipated event seen during whole regime.

Ref by: Dr. /04/12/22

Item	Information	Status
Liquefaction		Normal
Liquefaction treatment		No
Visual appearance		Normal
Viscosity		Normal
pH		8.0

II. Test Result

Parameter	Result	WHO 4th	95% CI
Ejaculate			
Sperm count	2.0 mL	≥ 1.4 mL	[13-15]
	1.5 M/mL	≥ 16 M/mL	[15-18]
Motility		≥ 39 M	[35-40]
	30%	≥ 42 %	[40-43]
- Rapid Progressive	0%	≥ 30 %	[29-31]
- Slow Progressive	<1%		
- Non-Progressive	0%		
Immotile	1%	≥ 1%	[1-1]
Morphology	89%	≥ 58 %	[39-40]
Normal forms	2%	≥ 4%	
Detail			
Concentration :			
MSC	0.3 M/mL		
(Motile Sperm Concentration)			
PMSC	0.02 M/mL		
(Progressive Motile Sperm Concentration)			

Morphology :

According to WHO Standard, when concentration is < 2M/mL, it is suggested to prepare the specimen with the use of a centrifuge.

Motility :

LIN (Mean)	50%	VSL (Mean)	10.2 μm/s
STR (Mean)	78%	VCL (Mean)	34.2 μm/s
WOB (Mean)	60%	ALH (Mean)	2.2 μm
VAP (Mean)	21.3 μm/s	BCF (Mean)	4.5 Hz

ORAL MEDICATIONS WITH DOSE

Date	Medicine	Dose	Anupana	duration
20/04/2025	1.Tab shiva gutika	½ tid	Warm water	4 weeks
	2.Siddha makaradwaja with gold	1-0-0	Warm water	15 days
	3.Awsagandha - 25 grms each Satavari Musali Kapikacchu Curna	½ tsp - 1 ½ tsp	Warm milk	3 weeks
13/5/25	On opd level oral medications			
	1.Aswagandha Grita	Warm water		8 weeks
	2.Madanakam eshwari Lehya	1 tsp - 0 1 tsp	Warm milk	8 weeks
	3.Vasanta Kusumakara Ras	1-0-0	Warm water	4 weeks
	4.Aswagandha Curna Satavari Curna Musali Curna	¼ tsp - 0 1 ¼ tsp	Warm milk	4 weeks

	<i>Kapikacchu Curna</i> 25 Grams Each			
13/7/2025	1. <i>phala sarpi</i>	10 ml - 0-10 ml	Warm milk	4 weeks
	2. <i>pusphadhanva rasa</i>	1-0-1	Warm milk	2 weeks
17/09/25	1. <i>Tab shiva gutika</i>	½-½-½	Warm water	4 weeks
	2. <i>Vanar i kalpa</i>	0-0-10 gm s	Warm milk	4 weeks
	3. <i>Mam athab ra rasa</i>	1-0-1	Warm water	4 weeks
22/10/25	1. <i>Aswagansha curna</i> <i>Satavari curna</i> <i>Musali curna</i> <i>Kapikacchu curna</i> <i>Bala curna</i> 25 grams each <i>Pippali curna</i> 10 gms <i>Abhraka</i> <i>bhasma</i> 5 gms	5-5-5 gm s	Warm milk	8 weeks
	2. <i>Naradiya laxmi vilasa rasa</i>	1-1-1	Warm milk	8 weeks
	3. <i>Tab shiva gutika</i>	½-½-½	Warm water	8 weeks
	4. <i>Phala sarpi</i>	10 ml - 0-0	Warm milk	8 weeks
	5. <i>Mamathabhra rasa</i>	1-0-1	Warm water	8 weeks

DISCUSSION-

In the present case report, a 40-year-old male with histologically confirmed Sertoli cell-only syndrome (Del Castillo syndrome) and long-standing azoospermia demonstrated a clinically meaningful response after 32 weeks of sequential ayurvedic interventions comprising *Virechana*, *Rajayapana basti*, *Vrishya basti* cycles, *Uttara basti* and supportive *shamanoushadi*. Post treatment semen analysis revealed the appearance of spermatozoa at a concentration of 3million/ ml with 20% progressive motility, indicating regeneration of

functional germ cells where none had previously been detected. These findings suggest that a multimodal *panchakarma* –based protocol targeting *Shukra dhatu* may offer non-invasive therapeutic avenue capable of partially restoring spermatogenesis in selected patients with non-obstructive azoospermia of SCOS phenotype, without any adverse events during the treatment or follow up period.

Despite its well-characterised histology, SCOS remains one of the least responsive forms of non-obstructive azoospermia to any form of medical or hormonal stimulation. The absence of a residual germ-cell pool in most tubules leaves clinicians with essentially no pharmacological lever to restore spermatogenesis, placing the entire therapeutic burden on surgical retrieval techniques. Contemporary reproductive medicine therefore offers no medical means of restoring spermatogenesis. The sole established route to biological parenthood remains microdissection testicular sperm extraction (TESE) followed by intracytoplasmic sperm injection. Although micro-TESE improves retrieval rates relative to conventional biopsy, success remains modest (approximately 30–50 % in pure Sertoli-cell-only histology) and the cumulative live-birth rate is reported to be as low as 13% . The procedure is invasive, expensive and associated with a measurable risk of postoperative hypogonadism; consequently, many couples ultimately choose donor gametes or adoption^[2]. It is precisely in this therapeutic vacuum that the present Ayurvedic intervention demonstrated a beneficial clinical response.

Beejopagataja klaibya is one among the types of *klaibya* that arises primarily due to vata-dosha vaishmya. The aggravated vata leads to progressive depletion of the other *Shareera* (bodily) dhatus, culminating in *shukra-dhatu kshaya*. To correct this *vatadi-dosha vaishmya* and to nourish the depleted *shukra dhatu*, the patient was administered a systematic course of *Virechana*. The protocol began with *deepana-pachana* using *Agnitundi Vati*¹⁴ and *Chitrakadi Vati*¹⁵, which kindled agni and produced the necessary *rukshana* effect prior to *Snehapana* (oleation). *Snehapana* was then performed with *Kalyanaka Ghrita*¹⁶, which is described in the literature as “*kalyanakamidam sarpih śreṣṭham pumsavaneṣu ca*”, signifying its excellence in *pumsavana* (producing a offspring). This was followed by *Virechana* with *Trivrit Lehya*¹⁷, which elicited thirteen *vegas*. Thereafter, a five-day course of *samsarjana krama* was instituted to restore the temporarily deranged *agni* to its normal state.

Following *Virechana*, oral medications were initiated to continue *shukra-var dhana* and *rasayana* action. *Shiva Gutika* (½ tid)¹⁸, *Siddha Makaradhwaja*¹⁸ with gold (1-0-0 for 15 days), and a combination of *Ashwagandha*, *Shatavari*, *Musali*

and *Kapikacchu* churna (½ tsp twice daily with warm milk) were administered. *Shiva Gutika* and *Siddha Makaradhwaja* are *rasayana* and *vajikarana* formulations that promote ojas and *shukra*. *Ashwagandha* is explicitly described as *shukrala*, *balya* and *rasayana* while *Shatavari*, *Musali* and *Kapikacchu* are well-known *shukravardhaka* and *vajikarana* drugs that directly address *shukra-kshaya*.

On the first OPD follow-up (13/05/2025), the regimen was modified to *Ashwagandha Ghrita*, *Madanakameshwari Lehya* (1 tsp twice daily), *Vasanta Kusumakara Rasa*¹⁸ (1-0-0) and the same four *churnas* in reduced dose. *Madanakameshwari Lehya* is a potent *vajikarana* preparation, and *Vasanta Kusumakara Rasa* is a *rasayana* specifically indicated for *dhatu-kshaya* and *balya* action. After an interval of approximately three months (from late April to mid-July), the patient was readmitted on 13/07/2025 for a course of *Rajayapana Basti*. *Anuvasana Basti* was given with *Ashwagandha Taila* and *Niruha* with *Rajayapana* formulation. *Yapana Bastis* are classically described as *shukra-mamsa-bala-janana* and *rasayana*. *Ashwagandha Taila* further potentiates *shukrala* action at the local and systemic levels. Concurrent oral medicines included *Phala Sarpi*¹⁹ (10 ml twice daily) and *Pushpadhanva Rasa*¹⁸ (1-0-1), both textually referred as *vajikarana* formulations.

On the subsequent admission (17/09/2025), *Vrushya Yapana Basti* was administered along with *Uttara Basti* and *Anuvasana Basti* using *Bala-Ashwagandhadi Taila*. *Bala* is *vatahara* and *balya*, while the combination with *Ashwagandha* enhances *shukra* nourishment and local tissue integrity of the reproductive tract. Follow-up oral medications at this stage comprised *Shiva Gutika*, *Vanari Kalpa*¹⁸ (a *Kapikacchu*-based *vajikarana*), and *Mamathabhra Rasa*. A further course of *Vrushya Yapana Basti* was repeated on 24/12/2025. From 22/10/2025 onwards, the oral regimen was intensified with a polyherbal churna (*Ashwagandha*, *Shatavari*, *Musali*, *Kapikacchu*, *Bala*, *Pippali* and *Abhraka Bhasma*), *Naradiya Lakshmi Vilasa Rasa*, *Shiva Gutika*, *Phala Sarpi* and *Mamathabhra Rasa*. *Abhraka Bhasma* and *Naradiya Lakshmi Vilasa*¹⁸ *Rasa* are potent *rasayana* drugs that support *dhatu-poshana* and *oja-varhdhana*, while the continued use of *shukrala* herbs sustained the regenerative effect on *shukra dhatu*.

Collectively, the sequential *shodhana*, *yapana basti*, *uttara basti* and sustained *shukrala-rasayana* oral therapy appear to have addressed both the *vata-vaishamya* and the resultant *shukra-kshaya*, culminating in the documented appearance of motile spermatozoa.

CONCLUSION:

In the present case study, a remarkable result was obtained in sertoli cell only syndrome by administering therapeutic cleansing procedures such

as *Virechana*, *Basti*, and *Uttarbasti*, along with Ayurvedic medicines

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Not applicable.

CONFLICTS OF INTEREST

There are no conflicts of interest.

1. Ghanami Gashti N, Sadighi Gilani MA, Abbasi M. Sertoli cell-only syndrome: etiology and clinical management. J Assist Reprod Genet. 2021 Mar;38(3):559-572. doi: 10.1007/s10815-021-02063-x. Epub 2021 Jan 11. PMID: 33428073; PMCID: PMC7910341.
2. Ghanami Gashti N, Sadighi Gilani MA, Abbasi M. Sertoli cell-only syndrome: etiology and clinical management. J Assist Reprod Genet. 2021 Mar;38(3):559-572. doi: 10.1007/s10815-021-02063-x. Epub 2021 Jan 11. PMID: 33428073; PMCID: PMC7910341.
3. Ghanami Gashti N, Sadighi Gilani MA, Abbasi M. Sertoli cell-only syndrome: etiology and clinical management. J Assist Reprod Genet. 2021 Mar;38(3):559-572. doi: 10.1007/s10815-021-02063-x. Epub 2021 Jan 11. PMID: 33428073; PMCID: PMC7910341.
4. Ghanami Gashti N, Sadighi Gilani MA, Abbasi M. Sertoli cell-only syndrome: etiology and clinical management. J Assist Reprod Genet. 2021 Mar;38(3):559-572. doi: 10.1007/s10815-021-02063-x. Epub 2021 Jan 11. PMID: 33428073; PMCID: PMC7910341.
5. Eugeni E, Arato I, Mancuso F, Brancorsini S, Luca G, Kofler S. Sertoli cells-only syndrome: current clinical approaches and ongoing research trends. Front Endocrinol (Lausanne). 2025 Dec 19;16:1715642. doi: 10.3389/fendo.2025.1715642. PMID: 41488147; PMCID: PMC12757265.
6. Eugeni E, Arato I, Mancuso F, Brancorsini S, Luca G, Kofler S. Sertoli cells-only syndrome: current clinical approaches and ongoing research trends. Front Endocrinol (Lausanne). 2025 Dec 19;16:1715642. doi: 10.3389/fendo.2025.1715642. PMID: 41488147; PMCID: PMC12757265.
7. Ghanami Gashti N, Sadighi Gilani MA, Abbasi M. Sertoli cell-only syndrome: etiology and clinical management. J Assist Reprod Genet. 2021 Mar;38(3):559-572. doi: 10.1007/s10815-021-02063-x. Epub 2021 Jan 11. PMID: 33428073; PMCID: PMC7910341.
8. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,30/161.p.641.

9. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,30/161.p.641.
10. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,30/202.p.642.
11. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,30/193.p.642.
12. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,30/193.p.642.
13. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,30/196.p.642.
14. Govinda Das. Bhaiṣajyaratnāvali. Mishra B, editor. Shastri A, commentator. Lochan K, translator. Vol 2. Reprint ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2008.
15. Govinda Das. Bhaiṣajyaratnāvali. Mishra B, editor. Shastri A, commentator. Lochan K, translator. Vol 2. Reprint ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2008.
16. Trikamji Y, editor. Charaka Samhita of Agnivesha, Ayurveda Dipika commentary by Chakrapani Datta. Varanasi: Chaukhamba Orientalia; 2020.Chikista Sthana,9/34-41.p.471.
17. Vagbhata. Ashtanga Hrudaya. Hari Sadashiva Shastri, editor. Varanasi: Chaukhamba Prakasham; 2016. Kalpana sthana , 2/9. p.642.
18. Govinda Das. Bhaiṣajyaratnāvali. Mishra B, editor. Shastri A, commentator. Lochan K, translator. Vol 2. Reprint ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2008.
19. Vagbhata. Ashtanga Hrudaya. Hari Sadashiva Shastri, editor. Varanasi: Chaukhamba Prakasham; 2016. Uttara sthana , 34/67. p.901.