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Case Report

Integrative management of anaplastic astrocytoma through a combination of Ayurveda and conventional care: A case report

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ABSTRACT

Anaplastic Astrocytoma (AA) is a relatively rare cancer, and is associated with a median life expectancy of 3 years after conventional therapy. Complete cure of the highly infiltrative AA is uncommon, and reports of positive outcome in cases of partial resection of AA are rare. Further, integrative approaches to the management of AA remain underexplored. This paper contributes to the limited literature in this domain by presenting a case that was successfully treated through integrative conventional and Ayurvedic interventions. A patient diagnosed with AA in the left parieto-occipital lobe underwent partial lesion resection followed by post-operative radiation and chemotherapy. The patient was given a conservative post-surgical life expectancy of two years, and was referred to an Ayurveda hospital for further treatment. The Ayurvedic intervention was focussed on redressal of radiation and chemotherapy side-effects, improvement of quality of life, and improving the patient's strength and immunity. Following this novel integrative model of care, the patient was able to resume all personal and professional routines, and a contrast MRI revealed absence of residual lesion allowing the patient to outlive his initial prognosis by several years till date. We posit that the findings of this report merit further examination in the interest of potential improvements to existing models of care.

1. Introduction

Anaplastic astrocytoma (AA), also called Grade III Astrocytoma or Grade III Malignant Astrocytoma, is a malignant, astrocytic, diffusely infiltrating primary brain tumour [1]. While the cause of AA remains unknown, it has been suggested that hereditary predisposition, and transformation from lower grade astrocytomas could play a causal role. Though clinical presentation of AA varies with site of tumour, common symptoms include headaches, lethargy, vomiting, altered mental states, and occasionally even seizures, hampered vision, gait instability and coordination and cognitive deficits [1]. Initial diagnosis is made using a contrast enhanced computer tomography (CT) or magnetic resonance imaging (MRI) scan, and confirmed by stereotactic biopsy or biopsy following surgical resection [2].

It is also frequently associated with IDH-1 and ATRX gene mutations [3]. One study found a 45% recurrence rate in IDH mutant AA cases following successful conventional therapy [1].

Conventional standard of care in AA includes surgical resection of the tumour followed by radiation and chemotherapy [4]. Though recovery in AAs is dependent on various factors such as size and location of tumour, extent of resection, and whether the tumour is de-novo or recurring etc, the highly infiltrative nature of AA makes tumour recurrence a considerable risk. The median survival rate, even after successful conventional therapy, and complete surgical resection, is 3 years. While some studies have shown that only 28% of these cases survive for up to 5 years [1], many patients also live with some degree of persistent cognitive/neurological deficits post treatment [5]. The chance of recurrence and spread is significantly higher in case of incomplete surgical resection [6]. Reports of positive outcome in cases of partial resection of AA are rare, although reporting/documenting such cases would nonetheless be of use in the improvement of existing models of care. Further, most clinical documentation of intervention in progressive life threatening conditions like cancers often tends to focus only on

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Allopathic standards of care. Management of such conditions through Ayurveda either independently, or in integration with conventional approaches, remains poorly documented. This paper contributes to the limited literature in this domain by presenting a case that was successfully treated through integrative conventional and Ayurvedic interventions.

2. Patient information and initial findings

A 36-year old male presented with a history of sudden onset of two episodes of generalised tonic-clonic seizures, early in the morning on 5th April, 2017, at the Aster CMI Multispecialty Hospital, Bengaluru, India. He had no known family history of AA. Clinical examination revealed evidence of tongue-bite, though he was conscious, able to understand and obey commands, and possessed normal pupillary reaction and limb movement at the time of examination. An MRI scan revealed an ill-defined lesion in the left posterior parieto-occipital lobar region ($43 \times 44 \times 45$ mm) showing cortical expansion with involvement of adjacent subcortical white matter and mild surrounding edema. His routine blood biochemistry revealed no abnormalities.

3. Timeline

3.1. Conventional management

On April 6th 2017, the patient underwent an emergency left parieto-occipital craniotomy during which 60% of the lesion was resected. Histopathological analysis of tissue sample confirmed diagnosis of AA in the left parieto-occipital lobe (WHO Grade III), possessing IDH-1 and ATRX gene mutations, and MIB-1 labelling (cell proliferation marker) of 10–12% - indicative of malignancy. The patient was given a conservative post-surgical life expectancy of two years. On 2nd May, 2017, adjuvant External Beam Radiation Therapy (EBRT) was begun, focussing on the post-operative residual T1 enhancing lesion, cavity, and 2.5 cm surrounding margins at a dose of 45 Gy in 25 fractions, followed by a boost to the T1 enhancing lesion, cavity and 1 cm surrounding margins at a dose of 14.4 Gy in 8 fractions. In total, he was given 59.4 Gy in 33 fractions from 2nd May 2017 till 15th June 2017. During this period, he began experiencing symptoms such as hand tremors, severe joint pain, constipation, hearing deficits, memory loss and extensive facial swelling, all of which were normal side effects of the radiation therapy. Oral chemotherapy was given simultaneously with temozolamide 140 mg during radiation, that was continued at a dose of 260 mg for 6 months (5 days a month) post radiation therapy.

On 22nd November, 2017, a repeat MRI showed the presence of a small surgical cavity in the post-operative bed, and the residual AA lesion measuring $33 \times 34 \times 22$ mm.

The patient was advised another cycle of chemotherapy, and was referred to an Ayurveda hospital as nothing further could be achieved through conventional treatment approaches.

3.2. Ayurvedic diagnostic findings and intervention

On 29th November, 2017, he approached the Ramaiah Indic Specialty Ayurveda Hospital, Bengaluru, India for an opinion regarding the scope and possibility of Ayurvedic intervention in his case. He presented with hand tremors (could not grasp a pen), joint pain in both major and minor joints (especially the knee joint, ankle joint and wrist joints - the patient could not stand up on his own from a sitting/supine position), hearing and visual deficits (the patient was seeing dark spots, and hearing a dull persistent sound), memory loss (patient could not remember passwords, numbers, dates) and extensive facial swelling. These symptoms began during the initial course of radiation therapy, but progressively worsened during the post-radiation chemotherapy. Although initial diagnosis proved to be difficult due to the multiple side-effects of chemotherapy observed amongst the presenting complaints, he was ultimately diagnosed with '*arbuda*' and medications were prescribed with the following objectives to a) to restore *dhātu* (seven vital elements that provide nourishment growth and structure to the body) equilibrium, b) to treat the *arbuda*, and c) to prevent its recurrence. In this regimen, particular focus was given to improving his '*bala*' – a combination term referring to physical strength, energy, and immunity. The following Ayurvedic formulations were prescribed initially (Table 1) (For ingredients of formulations, refer Box 1).

A timeline of follow-ups, clinical presentations, and medications given is shown below (Tables 2 and 3).

4. Follow-up and outcomes

Ayurvedic interventions were begun alongside the additional chemotherapy cycle that had been advised. With the exception of the five days of chemotherapy every month, the patient followed the Ayurvedic regimen (Table 1) for two months. The following week, the patient complained of a slight headache, so the *Kṣīrabalā Taila* application was stopped, while the remaining medications were continued for the next month as well. On follow-up, the same regimen was continued for an additional month.

A follow up MRI conducted on 23rd March, 2018, revealed insignificant reduction in lesion size ($34 \times 34 \times 28$ mm). Further, on follow up with the Ayurveda physician, it was found that joint pain had significantly reduced (the patient was able to stand from a sitting position and vice versa with minimal pain), facial swelling had ceased, visual deficits had almost disappeared and intensity of hand tremors had reduced. However, auditory deficits persisted. The same medication was continued for another month. By the next visit (8th May, 2018), the patient stated that his energy and physical strength had significantly improved, and he had been able to resume his professional commitments. He was completely free of

Table 1
Initial ayurveda treatment recommended on 29th Nov, 2017.

Name of the Drug	Dose
Guḍūcī Phāṇṭa	75 ml on an empty stomach at 7am in the morning
Cap. *Rasasindūra*	1 cap *Rasasindūra* with 15 ml *Varaṇādi Kaṣāya* with 45 ml water before breakfast and dinner
Varaṇādi Kaṣāya	
Syp. *Aśvagandhāriṣṭa*	2 Cruel capsules with 30 ml *Aśvagandhāriṣṭa* after breakfast and dinner
Cap. Cruel	
Tab. *Śivagulikā*	It is soaked in water 12 h before use, and 1 tablet is consumd daily at 5 pm
Cap. *Guggulu Tiktakam*	2 capsules are taken at bed time
Kṣīrabalā Taila	Warm oil, (heated on a double boiler) is used for external application over scalp before a head bath (twice a week).

Table 2
Follow-up history and clinical outcomes.

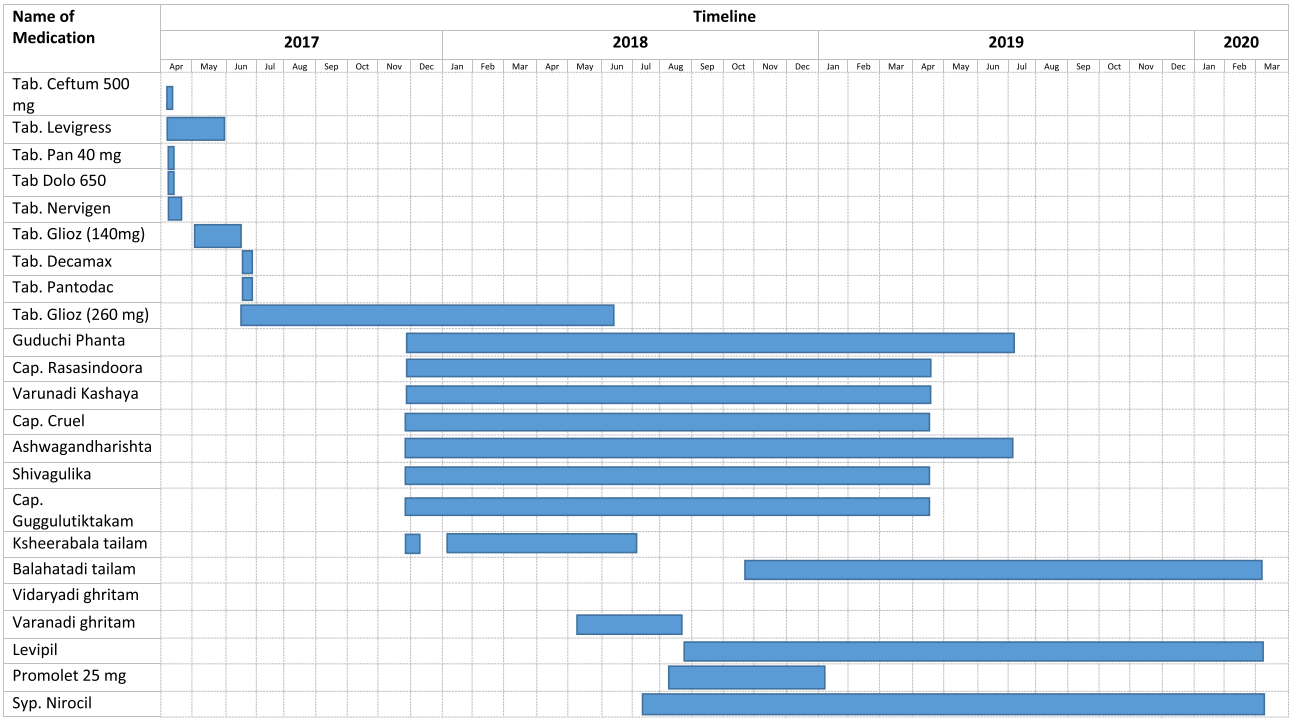
Timeline	Dates	Presenting Complaints	Treatment plan	Periodic clinical outcomes
Onset of Allopathy treatment	5th April 2017	History of sudden onset of two episodes of generalized tonic-clonic seizures	Left parieto-occipital craniotomy and near total excision of tumour on 6th April 2017	60% of tumour resected. 40% remained within eloquent area of brain
	8th April 2017	Discharge	Tab. Ceftum 500mg1-0-1 X 5 days Tab. Levigress 500 mg 1-0-1 to be continued Tab. Pan 40 mg 1-0-0 X 5 days Tab. Nervigen 1-0-1 X 15 days Tab. Dolo 650 1-1-1 X 5 days	Prevention of infection at surgical site and prevention of seizures
Follow-up 1	2nd May-15th June 2017		Post-surgery radiation therapy: Adjuvant External Beam Radiation Therapy to post-operative residual T1 enhancing lesion	Prevention of AA infiltration into surrounding tissues
	15th June – 15th Dec 2018		Oral chemotherapy with radiation therapy: Tab. Glioz (Temozolamide)140 mg (1-0-0) X 45 days	Inhibition of cellular proliferation
Follow-up 2	16th June 2017–16th June 2018	Stable residual lesion in posterior parieto-occipital lobe	Tab. Glioz (Temozolamide) 260 mg (1-0-0) X 5 days a month	Prevention of AA infiltration into surrounding tissues - Inhibition of cellular proliferation
Onset of Ayurveda treatment	29th November 2017	Severe hand tremors, joint pain, exhaustion, visual and auditory deficits	*Guḍūcī Phāṇṭa* Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Cap Cruel *Aśvagandhāriṣṭa* *Śivagulikā* Cap. *Guggulu Tiktakam* *Kṣīrabalā Tail*am	Slight reduction in pain and tremors. Auditory and visual deficits persistent.
Follow-up 1	5th Jan, 2018	Patient complained of mild headache	*Guḍūcī Phāṇṭa* Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Cap Cruel *Aśvagandhāriṣṭa* *Śivagulikā* Cap. *Guggulu Tiktakam*	Headache ceased in 24 h.
Follow-up 2	28th March 2018	No fresh complaints. Routine follow up.	*Guḍūcī Phāṇṭa* Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Cap Cruel *Aśvagandhāriṣṭa* *Śivagulikā* Cap. *Guggulu Tiktakam* *Kṣīrabalā Tail*am	Joint pain significantly reduced (patient able to stand from sitting position with minimal pain), visual deficits significantly reduced, and hand tremors reduced in intensity.
Follow-up 3	8th May 2018	Patient complained of no new hair growth.	*Guḍūcī Phāṇṭa* Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Cap Cruel *Aśvagandhāriṣṭa* *Śivagulikā* Cap. *Guggulu Tiktakam* *Kṣīrabalā Tail*am *Varaṇādi Ghṛt*am	Improved energy. Patient able to resume professional life. Pain completely relieved, visual and auditory deficits and hand tremors completely gone. Sparse hair growth observed.
Follow-up 4	2nd August 2018	Generalized tonic-clonic seizures along with fluctuating blood pressure	Levipil 500 mg (1-0-1) Promolet 25 mg 1-0-0 Both to be continued long term	Seizures stopped, Blood pressure under control
Follow-up 5	16th October 2018	Patient complained of mild headache	*Guḍūcī Phāṇṭa* Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Cap Cruel *Aśvagandhāriṣṭa* *Śivagulikā* Cap. *Guggulu Tiktakam* *Balāhatādi Tail*am *Varaṇādi Ghṛt*am Cap. Caractol	Headache resolved
Follow-up 6	23rd April, 2019	No fresh complaints. Routine follow up.	*Guḍūcī Phāṇṭa* Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Cap Cruel *Aśvagandhāriṣṭa* *Śivagulikā* Cap. *Guggulu Tiktakam*	Patient stable. Physical strength significantly improved.

(*continued on next page*)

Table 2 (*continued*)

Timeline	Dates	Presenting Complaints	Treatment plan	Periodic clinical outcomes
Follow-up 7	9th July 2019	Rhinnorhoea and sore throat associated with mild fever for past 3 days	*Balāhatādi Tailam* *Varaṇādi Ghṛtam* *Guḍūcī Phāṇṭa* *Aśvagandhāriṣṭa* *Varaṇādi Ghṛtam* *Balāhatādi Tailam* Syp. Nirocil	Sore throat, rhinorrhoea, fever abated.
Follow-up 9	17th March 2020	Mild rhinorrhoea for the past week.	*Varaṇādi Ghṛtam* *Balāhatādi Tailam* Syp. Nirocil	Rhinorrhoea resolved.

Table 3
Treatment/Medication timeline.



pain, swelling, hand tremors and relieved of all auditory and visual deficits. He complained of lack of new hair growth, though this was due to the continuing oral chemotherapy. One medication, *Vidāryādi Ghṛta*, was added to the above regimen, to assist with this.

This regimen was continued for 3 months, during which the patient was stable and experienced no fresh complaints. His second chemotherapy regimen concluded in June 2018, following which he was exclusively on Ayurveda medication. On 2nd August 2018, he suffered from mild generalized tonic-clonic seizures associated with blood pressure fluctuation, and was once again admitted to Aster CMI Hospital, Bengaluru. An MRI taken on 2nd August, 2018 revealed no significant interval changes to lesion size or presentation**.** While the exact cause of the seizures remained uncertain, the patient was advised anti-epileptic medication (levetiracetam) and anti-hypertensive medication (metaprolol succinate). On his subsequent follow-up Ayurveda visit on 21st August, Cap. Carctol was introduced to further prevent tumour expansion along with *Varaṇādi Ghṛta,* in place of *Vidāryādi Ghṛta,* as it was also useful in tackling the patient's new symptoms, and would not interact adversely with levetiracetam (Table 4).

Table 4
Revised ayurveda treatment on 21st August, 2018.

Name of the Drug	Dose
Guḍūcī Phāṇṭa Cap. Carctol Cap. *Rasasindūra* *Varaṇādi Kaṣāya* Syp. *Aśvagandhāriṣṭa* Cap. Cruel Tab. *Śivagulikā* Cap. *Guggulu Tiktakam* *Varaṇādi Ghṛta*	75 ml Phanta on an empty stomach with 2 caps Carctol 1 cap *Rasasindūra* with 15 ml *Kaṣāya* and 45 ml water 2 Cruel capsules with 30 ml *Aśvagandhāriṣṭa* twice a day 1 tablet at 5pm 2 capsules of *Guggulu Tiktakam* are taken with 1 teaspoon of *Varaṇādi Ghṛta* (melted on a double boiler) at bed time.

The next couple of follow-ups were largely uneventful. A routine MRI taken on 18th December, 2018 revealed no significant interval change in lesion size or presentation (32 mm × 31 mm X 28 mm). An almost identical medication regimen was continued for the next 6 months. In the interim follow-ups, the patient complained of a mild but persistent cough, rhinorrhoea, and occasional fever, for which he was treated according to Ayurvedic

Table 5
Revised treatment on 9th July, 2019.

Name of the Drug	Dose
Guḍūcī Phāṇṭa	75 ml Phanta on an empty stomach
Syp. *Aśvagandhāriṣṭa*	30 ml twice a day
Varaṇādi Ghṛta	1 tsp at bed time
Balāhatādi Taila	External application on head

Table 6
Timeline of progression of lesion size.

DATE	INTERVENTION (ongoing at the time)	LESION SIZE AS SEEN ON MRI (Transverse-Anteroposterior-Circumference)
5th April, 2017	Surgery	43 X 34 × 45 mm
22nd November 2017	Radiotherapy, Chemotherapy	36 X 34 × 32 mm
23rd March, 2018	Chemotherapy, Ayurveda	34 X 31 × 28 mm
2nd August, 2018	Ayurveda	34 X 31 × 28 mm
18th December, 2018	Ayurveda	32 X 31 × 28 mm
4th July, 2019	Ayurveda	14 × 9 mm
10th March, 2020	Ayurveda	Absent

protocols. A routine MRI done on 4th July 2019 showed significant interval reduction in lesion size (14 × 9 mm). By this time, the patient's strength had significantly improved, and none of the presenting complaints remained. In the absence of fresh complaints, the medication was gradually tapered (Table 5). However, medication for recurring mild cough and running nose was continued symptomatically.

The last routine MRI done on 10th March 2020 revealed no evidence of a contrast enhancing lesion. At the time of writing this article, the patient is healthy, has long returned to professional commitments and has already outlived his prognosis by four years. A timeline of progression of lesion size in periodic MRI reports has been presented below (Table 6) (Fig. 1).

5. Discussion

Complete recovery from AA is uncommon, with the median survival rate being 3 years, even after successful conventional therapy. Most clinical documentation of care and therapy in progressive life threatening conditions like cancers only includes conventional Allopathic care. Management of such conditions through Ayurveda either independently, or in integration with Allopathy, remains poorly documented. This case contributes to the limited literature in this domain by documenting a successful instance of integrative care in AA. Several factors play a role in disease management and cure including improved quality of life, symptomatic relief, and prevention of recurrence. While any individual system of medicine is theoretically equipped to provide all three, it has been found that, on occasion conditions such as in some cancers [7], tuberculosis [8], rheumatoid arthritis [9] etc., have shown improved treatment outcomes through an integration of conventional standard of care and Ayurvedic approaches. While a single case report is insufficient to make any categorical claims of

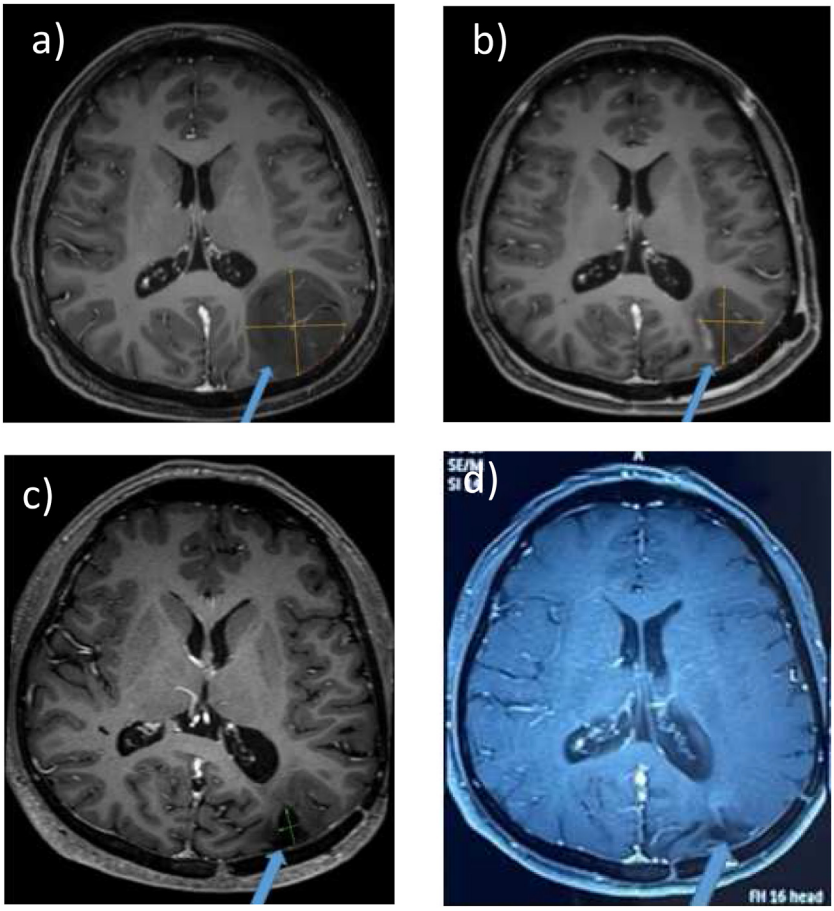


Fig.1. (L-R) - a) Non-contrast enhancing lesion measuring 4.3 × 3.4 × 4.5 cm, b) Post-operative cavity measuring 3.4 × 3.1 × 2.8 cm showing reduction in cavity hyperintensity, c) Significantly reduced non-contrast enhancing lesion measuring 14 × 9mm, d) No contrast enhancing lesion seen.

absolute efficacy, this case points to the scope that the integration of Ayurvedic and conventional treatment approaches could potentially possess in the improvement of existing models of care for AA.

5.1. The Ayurvedic approach

In Ayurveda, host susceptibility is an important factor in disease contraction, spread and severity. The aim of intervention therefore, is two pronged – a) identify and mitigate factors that are responsible for host susceptibility and b) specific treatment of disease. Consequently, in this case, the purpose of Ayurveda intervention was both to improve the body's strength and immunity, as well as treatment of tumour and related complications.

In Ayurveda, this disease was diagnosed as *arbuda* – cancer/tumour. A description of *arbuda* found in the *Suśruta Saṃhitā* begins with the term '*analpamūlaṃ*' – deep rooted – indicating fundamental and visceral *dosa* and *dhātu* vitiation [10]. As it progresses, it may present over a large area (*kṛtamūlam*) or become immovable (*acālyaṃ*), both of which indicate poor prognosis. *Arbuda* is particularly difficult to treat when it occurs over a vital organ/site (*marma*), or a *srotas* [11]. It may recur at the same site, following treatment (*adhyarbuda*), or at a different location (*dvirarbuda*). The *dvirarbuda* may occur at the same time as the host *arbuda* (*yugapat*), or after a certain time lapse (*kramāt*), indicating a metastasizing tumour/lesion [12].

The aim of the conventional treatment approach was first and foremost to resect the tumour and contain spread. The aim through Ayurveda was to a) improve strength and energy by cleansing the body's microchannels (*srotas*) and nourishing the *dhatus*, b) to treat the *arbuda*, and c) to prevent the incidence of *adhyarbuda*, or *dvirarbuda*. Classical treatment for *arbuda* usually consists of internal medication, along with external therapies such as *vamana* (therapeutic emesis) etc [13]. However, external therapies could not be adopted in this case due to the weakness of the patient and therefore intervention consisted solely of internal medication.

Ayurvedic formulations are composed of herbs, minerals, and metals in differing proportions processed variously for specific therapeutic outcomes. There are several active ingredients in such preparations that include micro, trace, and essential elements, that ideally work both independently and conjointly [14]. When used in integration with conventional medicine, it is particularly important to ensure that drug–drug interactions remain safe for the patient. In this case, no adverse reactions were observed.

Limitations of this case report -One of the main limitations of the case report as a medium is the inability to draw or even posit large scale conclusions of any kind due to the small sample size, and its particular focus on subjective response to treatment/intervention. This is further compounded in systems such as Ayurveda that often employ polyherbal and complex interventions whose modes of action are anyway difficult to map. This case report, accordingly, does not make any absolute claims with regard to the efficacy of integrated therapy in AA. Further, the complete disappearance of the residual lesion is remarkable, and additional studies will be required to establish the modes of action of the various interventions and the dynamics of their interactions, to determine whether and to what extent they were responsible for tumour disappearance, and consequently, to what extent these results can be replicated. Nonetheless, in the absence of such data, the findings of this case provide a novel instance where the integration of conventional and Ayurvedic approaches were able to provide a more effective therapeutic outcome in a case of AA. Further studies in the form of case reports, N-of-1 trials, and suitably designed randomized controlled trials will be required to investigate this further, and will go a long way toward improving existing models of care in AA.

6. Patient perspective

"Surgery, chemotherapy and radiotherapy were very helpful in removing 60% of tumour. But after 10 to 12 session of radiotherapy, I began experiencing some effects like hand tremors, joint pain, vision problems, hearing problems, constipation, loss of memory and my face was swollen a lot, and many more. I actually could not even write my name, or sign anywhere or drive. I am a person who loves travelling and driving over long distances. This became completely impossible after radiotherapy. Once I started taking Ayurveda, these effects drastically came down. Over one year, not only did my symptoms reduce, but my tumour also disappeared completely. Now I have completely resumed normal life, and am also able to drive with no difficulty. I have some occasional respiratory problems for which I continue Ayurveda medication. I am deeply grateful to Dr. G G Gangadharan, Dr. Ravi Gopal Varma, Dr. Ajay Rao and their team for making my recovery possible."

7. Conclusion

AAs are highly infiltrative cancers, and are usually associated with poor prognosis. Despite advanced surgical techniques and adjuvant therapies, much progress is needed to improve outcome in such cases. The role of Ayurveda and other complementary systems of medicine in improving outcome in AA, either independently, or in conjunction with conventional approaches, remains poorly studied. In this case, integrated intervention was associated with superior outcome, and complete recovery, with full return to normal personal and professional routines. This finding encourages future study in the interest of identifying more effective models of care in AA.

Data availability

The data that supports the findings of this study are not publicly available due to patient confidentiality agreements.

Statement of ethics

Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

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Declaration of competing interest

The authors have no conflict of interest.

Acknowledgments

We wish to acknowledge the patient for gracefully consenting to having his case documented, and for being extremely patient and proactive throughout the process of documentation.

Box 1. Ingredients per 100 gms of formulation

1. ***Guḍūcī Phāṇṭa***
    1. A non-concentrated decoction of *Tinospora cordifolia*

2. ***Cap. Rasasindūra***
    1. Purified mercury – 33.34 gms
    2. Purified sulphur – 66.67 gms
    3. Latex expressed from the buds of *Ficus benghalensis* – Q.S. (quantity sufficient)
3. ***Varaṇādi Kaṣāya/Varaṇādi Ghṛta***
    1. *Crataeva religiosa* – 6.25 gms
    2. *Strobilanthes ciliates* – 6.25 gms
    3. *Asparagus racemosus* – 6.25 gms
    4. *Plumbago zeylanica* – 6.25 gms
    5. *Marsdenia tenacissima* – 6.25 gms
    6. *Aegle marmelos* – 6.25 gms
    7. *Aristolochia bracteolata* – 6.25 gms
    8. *Solanum indicum* – 6.25 gms
    9. *Aerva lanata* – 6.25 gms
    10. *Pongamia pinnata* – 6.25 gms
    11. *Holoptelea integrifolia* – 6.25 gms
    12. *Premna corymbosa* – 6.25 gms
    13. *Terminalia chebula* – 6.25 gms
    14. *Moringa oleifera* – 6.25 gms
    15. *Desmostachya bipinnata* – 6.25 gms
    16. *Semicarpus anacardium* – 6.25 gms
4. ***Syp. Aśvagandhāriṣṭa***
    1. *Withania somnifera* – 9.2 gms
    2. *Curculigo orchioides* – 3.5 gms
    3. *Pueraria tuberosa* – 1.75 gms
    4. *Terminalia arjuna* – 1.75 gms
    5. *Rubia cordifolia* – 1.75 gms
    6. *Glycyrrhiza glabra* – 1.75 gms
    7. *Curcuma longa* – 1.75 gms
    8. *Cyperus rotundus* – 1.75 gms
    9. *Berberis aristata* – 1.75 gms
    10. *Operculina turpethum* – 1.75 gms
    11. *Pluchea lanceolata* – 1.75 gms
    12. *T. chebula* – 1.75 gms
    13. *Acorus calamus* – 1.42 gms
    14. *P. zeylanica* – 1.42 gms
    15. *Pterocarpus santalinus* – 1.42 gms
    16. *Ichnocarpus frutescens* – 1.42 gms
    17. *Santalum album* – 1.42 gms
    18. *Hemidesmus indicus* – 1.42 gms
    19. *Callicarpa macrophylla* – 0.71 gms
    20. *Elattaria cardamomum* – 0.71 gms
    21. *Cinnamomum zeylanica* – 0.71 gms
    22. *Cinnamomum tamala* – 0.71 gms
    23. *Zingiber officinale* – 0.35 gms
    24. *Piper nigrum* – 0.35 gms
    25. *Mesua ferrea* – 0.35 gms
    26. *Piper longum* – 0.35 gms
    27. *Woodfordia fruticosa* – 2.86 gms
    28. Honey – 53.56 gms
5. ***Cap. Cruel***
    1. Diamond ash – 0.10 gms
    2. Emerald ash – 0.17 gms
    3. Mica ash – 1.26 gms
    4. Gold ash - 1.26 gms
    5. Hydrargyri subchloridum – 5 gms
    6. *Sarveshwara Parpati* – 5 gms
    7. *Syzygium aromaticum* – 7.57 gms
    8. Copper ash – 10 gms
    9. *Boerhaavia diffusa* – 11.57 gms
    10. *Crateva religiosa* – 11.57 gms
    11. *G. glabra* – 11.57 gms
    12. *M. oleifera* – 11.57 gms
    13. *Tecomella undulata* – 11.57 gms
    14. *Ocimum sanctum* – 11.57 gms
6. ***Tab. Śivagulikā***
    1. Asphaltum punjabinum – 18.49 gms
    2. *T. chebula* – Q.S.
    3. *Terminalia bellerica* – Q.S.
    4. *Emblica officinalis* – Q.S.
    5. *A. marmelos* – Q.S.
    6. *Oroxylum indicum* – Q.S.
    7. *Gmelina arborea* – Q.S.
    8. *Stereospermum suaveolens* – Q.S.
    9. *Premna integrifolia* – Q.S.
    10. *Desmodium gangeticum* – Q.S.
    11. *Uraria picta* – Q.S.
    12. *Solanum indicum* – Q.S.
    13. *Solanum xanthocarpum* – Q.S.
    14. *Tribulus terrestris* – Q.S.
    15. *T. cordifolia* – Q.S.
    16. *Trichosanthes dioica* – Q.S.
    17. *Sida cordifolia* – Q.S.
    18. *G. glabra* – Q.S.
    19. Cow's urine – Q.S.
    20. Cow's milk – Q.S.
    21. *Lilium polyphyllum* – 1.15 gms
    22. *Fritillaria roylei* – 1.15 gms
    23. *C. rotundus* – 1.15 gms
    24. *Inula racemosa* – 1.15 gms
    25. *P. zeylanica* – 1.15 gms
    26. *P. lanceolata* – 1.15 gms
    27. *Polygonatum cirrhifolium* – 1.15 gms
    28. *Polygonatum verticillatum* – 1.15 gms
    29. *Piper chaba* – 1.15 gms
    30. *Scindapsus officinalis* – 1.15 gms
    31. *Cissampelos pareira* – 1.15 gms
    32. *Microstyllus muscifera* – 1.15 gms
    33. *Microstylis wallichi* – 1.15 gms
    34. *Baliospermum montanum* – 1.15 gms
    35. *P. tuberosa* – 1.15 gms
    36. *Ipomea digitata* – 1.15 gms
    37. *Coccinia grandis* – 1.15 gms
    38. *Asparagus racemosa* – 1.15 gms
    39. *Cocos nucifera* – 1.15 gms
    40. *Pistacia integerrima* – 2.31 gms
    41. *Z. officinale* – 2.31 gms
    42. *P. nigrum* – 2.31 gms
    43. *P. longum* – 2.31 gms
    44. *Abies webbiana* – 4.62 gms
    45. *P. tuberosa* – 1.15 gms
    46. *Bambusa arundinaceae* – 24 gms
    47. *Cinnamomum zeylanica* – 2.31 gms
    48. *Elettaria cardamomum* – 2.31 gms
    49. *C. tamala* – 2.31 gms
    50. *M. ferrea* – 2.31 gms
    51. *Sesamum indicum* – 2.31 gms
    52. Cow's ghee – 4.62 gms
    53. Honey – 9.24 gms
    54. Sugar – 18.49 gms
    55. *Jasminum officinale* – Q.S.
7. ***Cap. Guggulu Tiktakam***
    1. *Azadirachta indica* – 16.46 gms
    2. *T. dioica* – 16.46 gms
    3. *S. xanthocarpum* – 16.46 gms
    4. *T. cordifolia* – 16.46 gms
    5. *Adathoda vasica* – 16.46 gms
    6. *Cyclea peltata* – 0.41 gms
    7. *Embelia ribes* – 0.41 gms

8. *Cedarus deodara* – 0.41 gms
9. *P. chaba* – 0.41 gms
10. *Hordeum vulgare* – 0.41 gms
11. *Z. officinale* – 0.41 gms
12. *C. longa* – 0.41 gms
13. *Anethum sowa* – 0.41 gms
14. *P. chaba* – 0.41 gms
15. *Saussurea lappa* – 0.41 gms
16. *Zanthoxyllum alatum* – 0.41 gms
17. *P. nigrum* – 0.41 gms
18. *Holarrhena antidysentrica* – 0.41 gms
19. *Trachyspermum ammi* – 0.41 gms
20. *P. zeylanica* – 0.41 gms
21. *Picrorrhiza kurroa* – 0.41 gms
22. *Semecarpus anacardium* – 0.41 gms
23. *A. calamus* – 0.41 gms
24. *P. longum* – 0.41 gms
25. *P. lanceolata* – 0.41 gms
26. *Rubia cordifolia* – 0.41 gms
27. *Aconitum heterophyllum* – 0.41 gms
28. *Acontium sp.* – 0.41 gms
29. *Commiphora mukul* – 8.23 gms

8. ***Kṣārabalā Taila***
   1. *S. cordifolia* – 2.77 gms
   2. *S. cordifolia* decoction – 44.44 ml
   3. Milk – 44.44 ml
   4. Sesame oil – 11.11 ml
9. ***Vidāryādi Ghṛta***
   1. *P. tuberosa* – 6.66 gms
   2. *Ricinus communis* – 6.66 gms
   3. *Tragia involucrata* – 6.66 gms
   4. *Boerhaavia diffusa* – 6.66 gms
   5. *Cedarus deodara* – 6.66 gms
   6. *Vigna trilobata* – 6.66 gms
   7. *D. gangeticum* – 6.66 gms
   8. *U. picta* – 6.66 gms
   9. *Teramnus labialis* – 6.66 gms
   10. *S. xanthocarpum* – 6.66 gms
   11. *Solanum indicum* – 6.66 gms
   12. *Asparagus racemosa* – 6.66 gms
   13. *Leptadenia reticulata* – 6.66 gms
   14. *H. indicus* – 6.66 gms
   15. *T. terrestris* – 6.66 gms
   16. Cow's ghee - Q.S.
10. ***Cap. Carctol***
   1. *Blepharis edulis* – 40 gms
   2. *Piper cubeba* – 24 gms
   3. *Smilax china* – 16 gms
   4. *H. indicus* – 4 gms
   5. *T. terrestris* – 4 gms
   6. *Ammania baccifera* – 4 gms
   7. *Lepidium sativum* – 4 gms
   8. *Rheum emodi* – 4 gms
11. ***Balāhatādi Taila***
   1. *S. album* – 12.5 gms
   2. *Saussurea lappa* – 12.5 gms
   3. *G. glabra* – 12.5 gms
   4. *S. cordifolia* – 12.5 gms
   5. *Emblica officinalis* – 12.5 gms
   6. *T. cordifolia* – 12.5 gms
   7. *Vigna radiata* – 12.5 gms
   8. *Phaseolus trilobus* – 12.5 gms
   9. Oil of *Sesamum indium* – Q.S.
12. ***Syp. Nirocil***
   1. *R. communis* – 30.76 gms
   2. *Phyllanthus niruri* – 61.53 gms
   3. *T. cordifolia* – 7.6 gms
   4. Zinc ash – 0.015 gms
13. ***Ginger water***
   1. Dry ginger pieces soaked in water
14. ***Home remedy 1***
   1. *O. sanctum* – 25 gms
   2. *Coriandrum sativum* –25 gms
   3. *Z. officinale* – 25 gms
   4. Jaggery – 25 gms

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