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Recurrent Miscarriage Syndrome: A Biomedical Perspective and Ayurveda's Interpretation of It

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Recurrent Miscarriage Syndrome: A Biomedical Perspective and Ayurveda's Interpretation of It

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LIST OF ABBREVIATIONS

APS	Antiphospholipid Syndrome
BMJ	British Medical Journal
RCT	Randomised Control Trails
RM	Recurrent Miscarriage
RMS	Recurrent Miscarriage Syndrome
SM	Sporadic Miscarriage
TEG	Thromboelastogram
TD	Thrombophilic Disorders
TFR	Total Fertility Rate
VTE	Venous thromboembolism

Abstract

Many – if not most - women do not realise that miscarriage is the commonest complication of pregnancy. Current social change involves women having babies at a later age and the incidence of miscarriage is expected to increase as a result.

The objective of this study is to understand biomedicine's explanation of recurrent miscarriage syndrome - specifically the thrombophilic aetiology and its treatment strategy – and analyse Ayurveda's disease mechanism and treatment plan. The methodology was to search secondary data sources using composite search engines to mine established and lesser known publications. The search results were mixed with plentiful research for biomedicine but no journal articles on the Ayurvedic approach. Accordingly, Ayurveda's classical text and other Ayurveda text books were utilised to study Ayurveda's interpretation of this syndrome.

Results for biomedicine showed that an established treatment protocol exists but evidence for its success is limited. Several random control trials have been completed. However, they are hampered by methodological flaws or inconsistent results. By contrast, Ayurveda's classical texts neither define recurrent miscarriage syndrome nor have a treatment plan for the disease. Yet Ayurveda will be able to treat the underlying aetiology of the disease from its fundamental principles. However, the recommended treatment plan of change in diet, lifestyle and herbal supplement require time to be effective. To increase Ayurveda's scientific knowledge base, it is recommended that an in-vitro experiment be carried out to evaluate the efficacy of two of Ayurveda's herbal supplements - turmeric and amalaki - and the original substance of aspirin salicylic acid and compare these against the anticoagulant properties of aspirin.

Keywords: miscarriage, recurrent miscarriage, recurrent pregnancy loss, abortion, habitual abortion, spontaneous abortion, thrombophilia and adverse pregnancy outcome, Ayurveda and all of above

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1. Introduction

Culturally, miscarriage still carries a stigma in many parts of the world and is often not openly discussed – with many women suffering in silence. Most women do not realise that miscarriage is the most common complication of pregnancy (Rai and Regan 2006, p601). It is only in the past twenty years that routine ultrasound scans and clinical trials have facilitated a better understanding of this difficult condition. Categorising miscarriage as a specific clinical condition has facilitated the development of treatment strategies without stigmatising mothers.

Muller (1967, p78), author of the only articles on Ayurveda and miscarriage, quoted the Rigveda as saying that the only path to immortality is though one's offspring. This article further extols that the joy of bearing a son as the greatest joy of all and warns a mother never to plan an abortion as it would be considered murder of the first order.

1.1 Definition

Regan (2001, p6) cites the current legal definition of miscarriage in the UK as the "spontaneous loss of a baby with gestation age of 24 weeks or less". This definition - changed by an act of parliament in the 1990s - reflects the advancement of neonatal services that are currently available. These advanced services offer a baby born at 24 weeks the chance of survival (Regan 2001, p6).

A miscarriage is considered 'early' if it occurs before the thirteenth week of gestation. Thirteen weeks marks the end of the first trimester. A late miscarriage is the loss of a foetus thirteen weeks or older (Regan 2001, p12).

Miscarriage can be divided into two types: sporadic and recurrent (Rai and Regan 2006, p601). The latter is viewed as a specific clinical entity called Recurrent Miscarriage Syndrome (RMS).

Mosby's dictionary of Medicine defines recurrent miscarriage or habitual abortion as the spontaneous loss of three or more successive pregnancies before the twentieth week of gestation (Myers 2006, p842). As discussed above, the UK's definition of viability is twenty four weeks.

1.2 Epidemiology

RMS affects approximately 1% of fertile couples (Dawood, Quenby and Farquharson 2003, p46). Although RMS is defined as three consecutive losses, there remains deliberation as to whether two successive pregnancies would constitute RMS. At the Save the Baby Unit at St Mary's Paddington Hospital, the largest recurrent miscarriage (RM) clinic in the world, three miscarriages are required to accommodate the number of referrals (http://savethebabyunit.org 2008). If the number of RMs were decreased from three to two the problem would increase from 1% to 5% of all couples trying to conceive (Hogge, Byrnes, Lanasa and Suriti 2003, p397). As such, it can be concluded that the RMS affects between 1-5% of fertile couple trying to conceive.

The rationale for defining RMS as an independent clinical entity is as follows:

1. It is directly related to the success of prior pregnancies.
2. The observed incidence of RM (1%) is higher than expected by chance (0.345%).
3. It may occur even if the foetus has a normal chromosomal compliment.
4. It is positively correlated to increased maternal age.
5. It is positively correlated to diminished ovarian reserves.

(Knudsen, Hansen, Juul, and Secher, 1991; Nybo Andersen, Wohlfahrt, Christens, Olsen, and Melbye 2000; Regan, Braude, and Trembath, 1989; Regan, L. 1991)

Exalto (2005, p247) concludes that there is a subgroup or clinically recognised patient group that has a higher risk of miscarriage.

The second type of miscarriage referred to above is sporadic miscarriage (SM). By contrast with RMS, SM has an incidence ranging from 25%-50% (Greenwold and Jauniaux 2002; Stephenson, Awartani and Robinson 2002; Stirrat1990). SM is generally associated with random chromosomal abnormalities and is positively correlated to increased maternal age (Regan and Rai 2000). The focus of this study will be on RMS.

According to UK National Statistics, the total fertility rate (TFR) for England and Wales has declined from 2.5 to 2.0 children per woman from 1959-2007. This is a 20% decline over the period. The conception rate (per 1,000 in age group) has increased from 60 to over 80 for women between the ages of 30-39 years and almost doubled for women over 40 years. Conception rates for the 18-20 and 20-29 year-old age groups have, respectively, remained static and declined (http://www.statistics.gov.uk 2009).

These UK figures point to the social trends of reduced fertility and increased numbers of babies born to older mothers. Given these trends, the incidence of recurrent and sporadic miscarriage would be expected to increase for the UK.

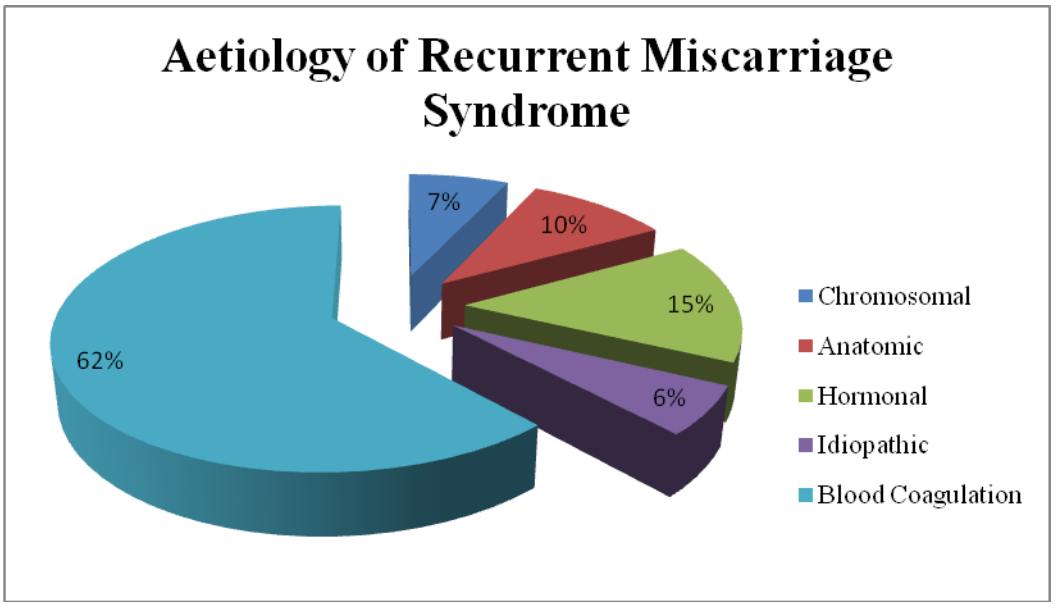
1.3 Aetiology

RM has, historically, been attributed to genetic, infective, anatomical, endocrine, immune and idiopathic causes (Regan and Rai 2002, p164). RM can lead to unfavourable outcomes in any of the three trimesters and is associated with defects in the depth and quality of implantation (Rai and Regan 2006, p601).

Exalto (2005) claims that 50% of RMS in a clinic setting remains inexplicable even after detailed investigation. Regan and Rai (2002, p164) put the same figure at almost 80%. This differential could be due to the time lag in improved treatment strategy and testing methodology for RMS from 2001 to 2005 or reflect the clinical and research bias present in randomised control trails (RCT) (Regan, Clifford and Rai 1996).

Bick (2000) notes more conclusive causes of RMS - attributing 7% to chromosomal abnormalities, 10% to anatomical abnormalities, 15% to hormonal abnormalities (progesterone, oestrogen, diabetes mellitus or thyroid disease), 6% to idiopathic causes and 55%-62% to blood coagulation proteins/platelet defects (Figure 1).

Figure 1: Defects Causing Recurrent Miscarriage Syndrome (approximate)



Source: Bick (2000)

Research over the past two decades has linked thrombotic haemostasis with RMS. This thrombophilia can be acquired or inherited (Middeldorp 2007, p276). These blood protein/platelet defects represent (1) Antiphospholipid Syndrome (APS) and (2) Thrombophilic Disorders (TD) (Bick and Hoppensteadt 2005, p2). Rai and Wakeford (2001, p220) note that since its original description, 15 years ago, APS has emerged as the most important treatable cause of RMS. APS is considered an acquired blood protein/platelet defect. Further APS has created an opportunity for increased research and understanding between thrombophilic abnormalities and adverse pregnancy outcomes (Rai and Wakeford 2001, p218). APS is associated with lupus anticoagulants and anticardiolipin antibodies (Table 2). TD results from an exaggerated haemostatic response leading to a thrombosis of the utero-placental

vasculature prevalent during pregnancy that is distinct from APS. TD is associated with inherited thrombophilic defects such as V (Leiden) G1691A, Factor II (prothrombin) G20210A and methylene tetrahydrofolate reductase C6777T (Table 2). These two types of blood protein and platelet defects will be the focus of the biomedical mechanism and treatment plan of this paper.

Biomedicine further acknowledges the significant mental and psychological morbidity that is associated with RMS. RMS can involve frustration for both patient and clinician where a high percentage of aetiology can be attributed to idiopathic causes. Rai and Regan (2006, p601) note that a third of the women attending specialist recurrent miscarriage clinics are clinically depressed and that one in five have levels of anxiety that are similar to those of psychiatric outpatient population.

Similar to biomedicine, Ayurveda points to the intricate correlation of the mind, body and soul in the process of pathogenesis. Ayurveda defines health as:

> He, in whom, the dosas, agni (digestive power), dhatus (tissues), malas (waste products) and their activities are normal; his soul, sense organs and mind are calm/clear, is called Svastha (healthy person) (Susruta Samhita 15:41 - Murthy 2004, p110).

The aetiology of any disease will be the vitiation of the dosas, a lowered agni that in turn will deplete the nutrition and thus the function of the dhatus. The final dhatu is sukra in men and arthva in women which is the tissue of reproduction. This reproductive tissue further nourishes ojas which is the essence of all bodily tissues. Ojas bestowed strength to the body, protects the dhatu and provides resistance and immunity against disease (Murthy 2003, p87).

1.4 Aim

The objective of this study is to better understand biomedicine's explanation of RMS specifically the thrombophilic aetiology (APS and TD) and its treatment strategy and to explore Ayurveda's pathway to RMS. As discussed in section 1.2, the incidence of

miscarriage is expected to increase as a result of social changes – with women having babies at a later age. As such, this topic is relevant as an increasing number of women likely to explore aetiology and treatment plans for the condition.

No journal articles have been written on Ayurveda and miscarriage. Therefore, the classical text and other Ayurveda text books have been utilised to study Ayurveda's interpretation of RMS. Rather than exploring Ayurveda through biomedical terms and contrasting Ayurveda with Biomedicine; Ayurveda's fundamental principles will be explored.

Ayurveda utilises its fundamental principles to evaluate aetio-pathogenesis prior to the appearance of cardinal signs and symptoms. However, patient management and treatment plans are customised on a case by case basis. Therefore, a general discussion of Nidanam (aetiology), Samprapti (pathogenesis), Ayurvedic digestion and nutrition will be discussed before the specific pathways of RMS and its treatment strategy are explored.

In the final section, suggestions will be made for future studies on the topic

2. Methodology

Secondary sources were used and data bases mined for both biomedical and Ayurvedic studies. The search strategy involved the use of ISI Web of Knowledge (http://isiknowledge.com, 2008). The keywords used included: habitual abortion, recurrent miscarrag*, spontaneous abortion*, pregnancy loss, pregnancy, miscarriage, recurrent pregnancy loss, ayurvedic medicine, ayurved*, traditional Indian medicine, herbal medicine. All of these terms were searched individually as well as combined with AND and OR.

ISI Web of Knowledge is a composite search engine that mined established journals such as The British Journal of Medicine (BMJ) and less well-known publications such as The Indian journal of Traditional Knowledge, The Journal of Alternative and

Complementary Medicine. Reference lists of key articles were further mined to locate specific journal articles relevant to the topic.

British Library Direct, Science Direct and Google Scholar were mined. Selection criteria for all of these searches were: no exclusions or inclusions with the exception that all articles to be written in the English language. No time limits were specified.

The search results were mixed - with substantial research for biomedical studies on RMS but no articles found on Ayurveda and miscarriage. Some references for non-specific books were located for Ayurveda through Google Scholar but no specific journal articles were found. Only one journal article - written in German in 1967 – was found using the keywords Ayurveda and miscarriage. The article referenced planned miscarriage as a terrible act as it would not facilitate emancipation of the parent's soul through specific passage rites that traditionally a male heir would perform on behalf of his dead parents.

In light of the above findings and the interest of the author in pursuing the topic, it was decided that the paper would be written as a journal article as opposed to a literature review. This enabled the use of Ayurveda's classical text books dating back 1,500 B.C. as well as other textbooks on Ayurveda. A literature review was completed for the biomedical sections. This literature review encompassed the search strategy as listed above using the same keywords and exclusion/inclusion criteria. The role of the literature review was to provide (1) a platform for the paper and (2) material for the discussion section as recommended by Levin (2005, p75).

In terms of the structure and style of the paper, BMJ resources for authors were reviewed (http://resources.bmj.com/bmj/authors/types-of-article/research 2009) (Appendix 1) and several discussions were had with supervisor to deliver the optimal format for the work. The standard IMRaD style (introduction, methods, result and discussion) was used on the basis of its versatility – with specific changes made to accommodate the scope of this particular study.

3. Discussion:

3.1 Biomedicine's Thrombophilic Mechanism for RMS

Bick and Hoppensteadt (2005, p2) explain that there are two pathways for blood protein or platelet disorders during RMS: (1) hemorrhagic tendencies (Table 1) and (2) thrombotic or hypercoaguable/thrombophilic defects (Table 2). The former is uncommon in RMS while the latter is more widespread.

Table 1: Bleeding Disorders Associated with Recurrent Miscarriage Syndrome (uncommon)

- Factor XIII Deficiency
- Von Willebrand Disease
- Factor X Deficiency
- Factor VII Deficiency
- Factor V Deficiency
- Factor II Deficiency
- Hypofibrinogenemia
- Dysfibrinogenemia
- Haemophilia A Carrier

Bick and Hoppensteadt (2005, p3)

Table 2: Thrombotic Disorders Associated with Recurrent Miscarriage Syndrome (common)

- Antiphospholipid Syndrome

- Sticky Platelet Syndrome
- MTHFR Mutations
- Hyperhomocysteinemia
- PAI-1 Elevation/Polymorphisms
- Protein S Deficiency
- Factor V Leiden
- Prothrombin G20210A
- Protein C Deficiency
- Antithrombin Deficiency
- Heparin-Cofactor II Deficiency
- TPA Deficiency
- Elevated Lipoprotein (a)
- Immune Vasculitis

Bick and Hoppensteadt (2005, p3)

Pregnancy in humans is a naturally hypercoaguable state that is required for the stability of the maternal placenta (Rai and Regan 2006, p605). Rai and Wakeford (2001, p221) define thrombophilia as a tendency to thrombosis or clot. The most frequent thrombotic problem in pregnancy is venous thromboembolism (VTE). Unrelated to RMS is pulmonary thromboembolism, which is a major cause of maternal death in the developed world (Greer 2003, p73).

Rai and Wakeford (2001, p221) explain that the hypercoagulability results from: (1) an increase in the levels of procoagulant factor, (2) a decrease in the levels of anticoagulant protein (e.g. protein S – Table 2) and (3) a decrease in fibrinolysis. This haemostatic abnormality reduces the ability of the RMS sufferer to cope with the hypercoaguable assault during pregnancy. Specifically, Bick and Hoppendsteadt

(2005, p2) explain that blood/platelet defects lead to inadequate fibrin formation (as discussed above) thereby reducing the ability of the fertilised ovum to implant into the uterus.

The blood circulation of a successful pregnancy is based on a dynamic balance between the coagulation and fibrinolytic systems (Regain and Rai 2002, p164). As discussed in section 1.3 it is the defect in the depth and quality of implantation that leads to the RM. Especially pertinent for early miscarriers is that the diameter of the placenta and uterine vessels, both venous and arterial, are especially small and even a partial occlusion by a thrombus can preclude adequate nutrition and thus reduce the viability of the foetus (Bick 2000; Bick and Hoppensteadt 2005,p2). Advances in ultrasound technology such as Doppler scans have facilitated monitoring the smallest inter-utero vasculature (Regan 2001, p187).

3.2 Biomedicine Treatment Strategy for Blood Protein and Platelet disorders

3.2.1 Investigation

A thromboelastogram (TEG) has developed as a cost effective, reproducible prognostic tool for (1) predicting poor pregnancy outcome and (2) gaining patient's willingness for treatment (Mallet and Cox 1992, p307; Chandler 1995, p1). Conventional tests for haemostatic abnormalities remain expensive, time consuming and limited in their ability to comprehend the dynamic inter-utero process involving the coagulation and fibrinolytic pathways combined with cellular elements such as endothelial cell surfaces (Regan and Rai 2002, p173).

3.2.2 Psychological

The mental and physiological anguish is immense for RMS sufferers: anxiety, depression, denial, anger, marital disruption, sense of loss and inadequacy play a central role. Kaplan (1991, p909) has suggested that a psychoneuroendocrine network where physiological factors influence the immune system is prevalent in miscarriage. Further studies in mice have shown stress induced miscarriage (Arck, Rose, Hertwig,

Hagen, Hildebrandt, and Klapp 2001, p1505) and raised levels of CD8+ T cells TNFα and tryptase-positive mast cells have been reported in the endometriums of women with sporadic miscarriage and high stress scores (Nicol, Zielenski, Tsui and Wells 2000, p111).

3.2.3 Aspirin and Heparin

Aspirin has a thromboprophylactic effect by inhibiting platelet aggregation and heparin is an anticoagulant drug. Low molecular weight heparin has been found to bind to antiphospholipid antibodies as well as protect the maternal vascular endothelium from damage in early pregnancy and thrombus and infraction in late pregnancy (Rai and Regan 2006, p607).

In 1997 the first RCT comparing the efficacy of low dose aspirin (75mg -150mg/day) alone and in combination with heparin was completed. The latter proved highly beneficial especially for those RMS suffers with a definitive diagnosis of APS. The study showed that for women taking aspirin alone the miscarriage rate fell from 90% to 60% which is an increase of live birth rate of 40%. The combination of aspirin and heparin further increased live birth rate to 70%. This study was completed over a three year period (Regan 2001, p186). Rai and Regan (2006, p607) note that there is no demonstrable benefit of aspirin alone for RMS sufferers who have been diagnosed with only a thrombophilic defect (non APS). Rai and Regan (2006, p607) also acknowledge that the efficacy of heparin has to be established in cases of RM of unknown cause.

Bick and Hoppensteadt (2005, p.1) claim similar success in another three year American study of three hundred and fifty-one women who were RMS sufferers and who had been pre-screened for the absence of anatomical, hormonal or chromosomal defects. The protocol was to administer low-dose aspirin (81mg/day) on preconception with immediate post conception addition of heparin or low molecular weight heparin. Results were that only two of the thrombophilia patients suffered another miscarriage; all others had normal term delivers. Further, there was no

pregnancy related thrombosis, no delivery complications and no episodes of post-partum thromboses.

3.2.4 Safety of Aspirin and Heparin in Pregnancy

Professor Regan, an eminent consultant gynaecologist/obstetrician and scientist, cites several studies that have tracked the use of aspirin in pregnancy. Aspirin crosses the maternal placenta but has been found to be safe with no side effects on both the baby and the mother. Regan further cites large European CLASP studies that have tracked babies exposed to inter-utero aspirin up to age seven and found no physical or neurological developmental issues (2001, p189). However, two large studies - one case-controlled and the other a meta-analysis - found that the consumption of low dose aspirin especially during the first trimester of pregnancy had a two to three fold increase of the risk of foetal gastroschisis (Kozer, Nifkar, Costei, Boskovic, Nulman and Koren 2002, p1623; Werler, Sheehan and Mitchell 2002, p26).

Heparin does not cross the maternal placenta and thus does not reach the baby. However, its use has had some side-effects for the mother. It is administered via injection and can cause bruising at the site. Some rare cases have reported a drastic fall in maternal platelet count. The most serious side-effect reported has been the bone health of women taking heparin during pregnancy placing these women at a higher than normal risk of osteoporosis (Regan 2001, p191).

3.3 Ayurveda's Fundamental Principles

Unlike biomedicine, Ayurveda can analyse and treats illness prior to the appearance of signs and symptoms (Appendix 2) or specific manifestations of disease (Appendix 3). As such, Ayurveda analyses preliminary nidana and samprapti from its fundamental principles and its treatment strategy is customised per individual and dependent on the specific vitiation of dosa, dhatu, srota and depletion of agni and ojas.

There are five aspects to nidana (Appendix 2). Murthy (2003, p9) explains that diagnosis will be complete if more than two of the means of nidana are adhered to. Similarly there are six stages to samprapti (Appendix 3) - four prior to the manifestation of specific illness.

Madhavakara in his Madhava Nidanam (1:14) states that:

> The cause of all disease is the morbid (increase) dosas (humors) and the cause for morbid increase of the dosas is indulgence in different kinds of unhealthy foods and activities (Murthy 2005, p5).

Murthy (2003, p17) explains that humans indulge in various foods and activities on a daily basis that may be wholesome to the body or unwholesome. The latter are called Mithyaharavihara. Even wholesome diet and lifestyle can be unwholesome when the body habituates to such conditions - completed in excess or at the inappropriate time.

Caraka Suthrastana (XI:36-43) says that excessive utilisation, non-utilisation or wrong utilisation of objects, acts and time initiates malady:

1. Asatmyaendriyartha Samyoga (Artha) - unwholesome conjunction of sense organs.
2. Prajnaparadha (Karma) - intellectual blasphemy or ignoring own wisdom.
3. Parinama (Kala) – transformation, effect of climate, season.

(Sharma and Begawan Dash 2006, p220)

These three factors are the key underlining aetiology of disease regardless of its manifestation in mind or body. It is the mithyaharavihara, artha, karma, and kala that bring about changes first in the tridosa and then impacting the dhatus – the commencement of pathogenesis (Murthy 2005, pxix).

3.3.1 Ayurvedic Digestion and Nutrition

Caraka Cikitsastana (XV: 1-5) explains the importance of Agni which is the element of internal fire. Murthy (2003, p55) explains that strength, colour and complexion, health, enthusiasm, age, ojas and life itself is dependent on the functioning of agni.

Biomedicine would classify agni as the enzymes responsible for digestion and metabolism (Sharma and Bhagavad Dash 2005 IV, p2). However, agni will digest more than food and includes all mental impressions ingested by the sense organs (Frawley 1998, p178). Caraka Sarirasthana (I:23) notes that "objects are perceived with the help of the sense organs together with the mind" (Sharma and Bhagwan Dash 2005 II, p317). Frawley (1998, p178) explains that the senses also intake emotional and mental influences through the sense organs.

Digestion, metabolism and nutrition are at the heart of Ayurvedic disease management. Certain levels of mithyaharavihara can be accommodated if agni functions optimally. Agni is of 13 types: jatharagni, five bhutagni and seven dhatuagni. Jataragni is the lead fire and controls the remaining twelve categories of agni. Caraka Cikitsastana (XV:3) states that " jatharagni is the mula or sustaining factor of all living beings" and adds that maintenance of proper agni extends life whereas impairment leads to disease and death (Sharma and Bhagwan Dash 2005 IV, p2). Impairment of agni can be of three kinds:

1. Visamagni - variable digestive ability: at times complete and at others incomplete resulting in a mixture of digested and undigested foods.
2. Tiksnagni – powerful digestive ability: able to digest even large quantities of food without difficulty however food could also be burnt or charred.
3. Mandagni – weak digestive ability: cannot digest even small quantities as a result food will be inadequately digested or not digested at all.

The fourth type of agni is Samagni: normal agni that is not impaired (Murthy 2005, p29; Murthy 2003, p56).

Murthy (2003, p58) explains that in all of three types of impairment digestion will be compromised resulting in a build up of ama or toxins in the amasaya. Left unchecked, this accumulation will continue to increase and infiltrate rasa dhatu (samarasa), which is nourished and formed by post digestive nutrients. As the three dosa circulate in rasadhatu, they will be vitiated by ama as well as the successive dhatus and mala.

Caraka Cikitsastana XV:5 notes that the significance of dhatu nutrition is the nourishment of ojas - the sara (essence) of all dhatus. Ojas is of two types: (1) Para - present in the heart; (2) Apara - present in the dhatus. As mentioned in section 1.3, ojas is synonymous with the strength of the body and its resistance and immunity (Murthy 2003, p86). Ojas cannot be formed by undigested foods and is improperly formed by ama filled dhatu (Sharma and Bhagwan Dash 2005, p3). Vagbhata in Astanga Hrdayam Suthrastana XI: 37-40 27 highlights that decreased ojas weakens the body and increases its susceptibility to disease (Murthy 2004, p164).

Vagbhata's Astanga Hrdayam further explains that in addition to poor digestion and nutrition ojas will also be depleted by emotions such as anger, worry, grief, fear, anxiety and excessive thinking (Murthy 2004, p164).

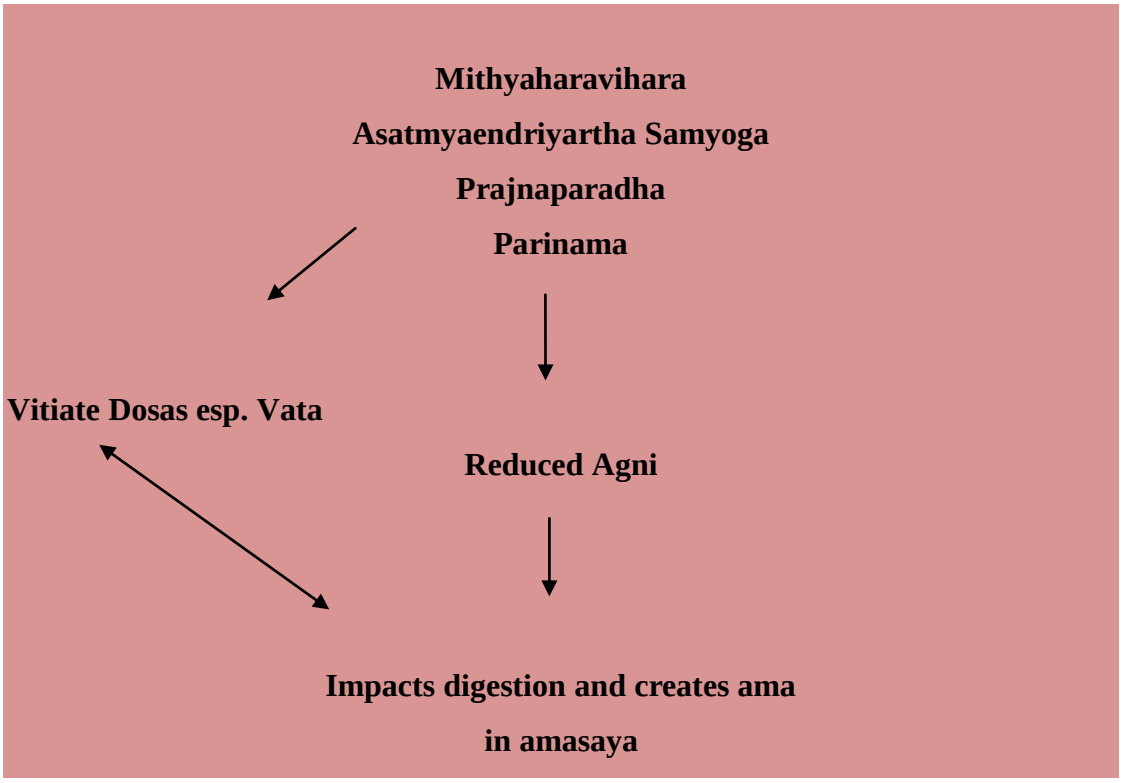
3.3.2 Srota System

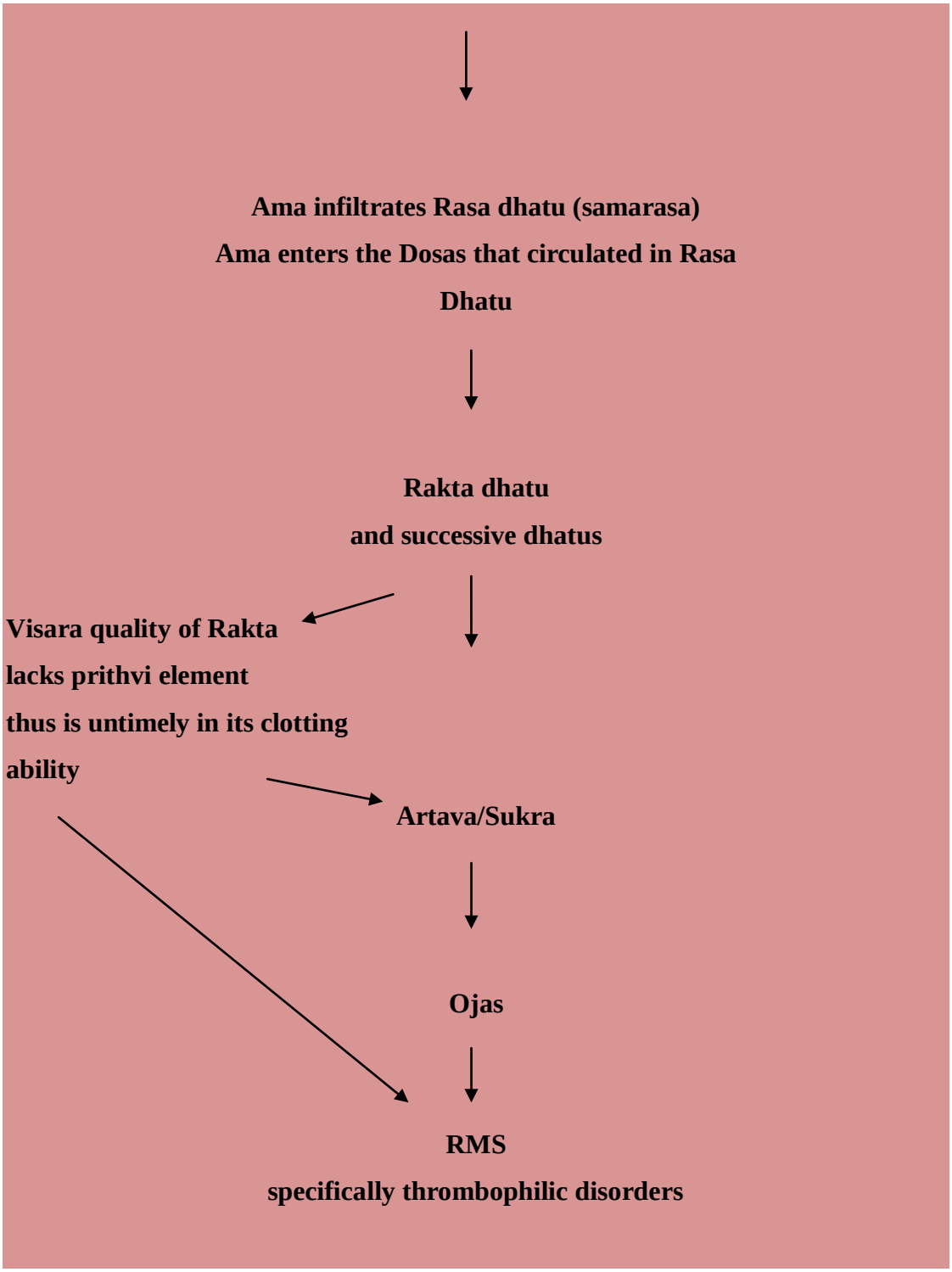
Srota are the all-pervasive channels of circulation around the body especially carrying the dhatus to their destination (Sharma and Bhagwan Dash 2005 II, p170). Caraka Vimanastana (V:6) explains that as long as the channels of circulation perform their normal function the body is free from disease (Sharma and Bhagwan Dash 2005 II, p173). Srota dusti are vitiation of the srota system (Appendix 3). Caraka identifies 13 srota – one for each dhatus, malas, prana, food and water. He explains that the 'sentinel' portions of the body that are beyond the senses are sustained by the monovahasrota – channel of the mind (Sharma and Bhagwan Dash 2005 II, p173).
Caraka Suthrastana V: 23 says that "food and regimes that promote morbidity of the dosas and go contrary to the well-being of the dhatus vitiate the channels" (Sharma and Bhagwan Dash 2005 II, p180)

3.4 Ayurveda's Pathway for RMS

Caraka Cikitsastana XXX enumerates 30 types of yoni vyapat or gynaecological disorder most of which result from the vitiation of vata (Sharma Bhagwan Dash 2005 V, p129). These disorders range from vata, pitta and kapha gynaecological derangement as well as other issues such as amenorrhea, virginities, dysmenorrhoea and loss of libido to name a few. However, none of them relate specifically to RMS or habitual abortion. In addition to vata vitiation, Caraka Sarirasthana II:6-10 cites fertility issues resulting from defects in uterus, mental afflictions, defects in the sperm, ovum, diet and regime. These are not dissimilar to the biomedicine aetiology with the exception of diet and lifestyle. Similarly Gupta and Bharati (1999, p266) categories the aetiology of yoni vyapat as follows: (1) inflammatory diseases, (2) dysfunctional uterine diseases, (3) sterility and habitual abortions and (4) anatomical defects. They conclude that the primary cause is mithyaharavihara as discussed in section 3.3.

Figure 2: Flow Chart of Ayurveda's RMS Pathway via Fundamental Principles





Source: Caraka Samhita (Sharma and Bhagwan Dash 2005 Volumes 1-VII)

Tiwari (1999, p325), an eminent Ayurvedic gynaecologist/obstetrician, cites psychological and mental disorders of the mother as one of the primary aetiology of miscarriage. She cites Caraka, Susruta, Vagbhata and Madhavakara as all mentioning:

anger, grief, discontent, jealousy, fear, terror and irritation impacting both early and late miscarriages. As such, RMS will impact all of the dhatu srotas as well as monovahasrota. Madhavakara says, "Death of the foetus may take place due to the mental disorders" (Murthy 2005, p226).

3.5 Treatment Strategy

Diet, lifestyle and mental consistency are at the heart of Ayurvedic disease management. Frawley (1998, p187) explains that diet and lifestyle changes will impact not only the physical body but also the mind and spirit. He notes that food provides three levels of nutrition: (1) physical (outer level), (2) mental (inner level) – impacted by sensory and mental impressions and (3) spiritual (core level). The discussion of treatment for the physical body will thus also encompass the mental and spiritual elements.

3.5.1 Diet and Lifestyle

As shown in Figure 2, deranged vata and depleted ojas are the underlying causes of RMS as interpreted by Ayurveda. Caraka Suthrastana XII:7-8 describes vata in its normal state as sustaining the function of the all the organs of the body. However when aggravated it "perturbs the mind; affects all sense faculties; destroys, deforms or detains the embryo; gives rise to feat, anxiety, bewilderment, humility and delirium" (Sharma and Bhagwan Dash 2006, p238).

Caraka Suthrastana XVII: 73 states that ojas has the colour of ghee, the tastes of honey and the smell of freshly roasted paddy (Sharma and Bhagwan Dash 2006, p326). Lad (2002, p211) notes that ojas is the pure essence of kapha, which has the qualities of heavy, slow, oily, slimy, soft, dense, gross and are composed of prithvi (earth) and ap (water) elements (Lad 2002, p31).

According to Caraka Vimanastana (I:3), once the aetiology, symptoms, and dosa have been assessed, the treatment plan needs to customise the individual's diet based on the qualities of the Rasas (Sharma and Bhagwan Dash 2005 II, p112).

Table 3: Rasa Food Energetics

Rasa	**Mahabhuta Composition**	**Dosa Increase**	**Dosa Decrease**
Madura (Sweet)	Prithvi + Ap	Kapha	Vata, Pitta
Amla (Sour)	Prithvi + Tejas	Kapha, Pitta	Vata
Lavana (Salt)	Tejas + Ap	Kapha, Pitta	Vata
Katu (Pungent)	Vayu + Tejas	Vata, Pitta	Kapha
Tikta (Bitter)	Vayu + Akasa	Vata	Kapha, Pitta
Kashaya (Astringent)	Prithvi + Vayu	Vata	Kapha, Pitta

(Lad 2002, p 249; Sastry 2004, p 102; Sharma and Bhagwan Dash 2005 II, p114)

Caraka Vimanastana (I:7) explains that dosa are alleviated by opposite tastes. To calm vata, madura, amla and lavana tastes must be utilised. These same tastes will increase kapha and therefore ojas as kapha and ojas have similar qualities. RMS sufferers must avoid katu, tikta and kshaya tastes that will further aggravate vata, reduce ojas and are catabolic by nature. Madura, amla and lavana tastes are composed of pritivi, ap and tejas Mahabhuta (elements) and have the attributes listed in Appendix 4.

Lad (2008) has a detailed list of foods that are suitable for specific constitutions. The vata reducing diet should be followed by RMS sufferers (Appendix 6). Further, foods must be eaten warm and cooked - avoiding raw foods, vegetables and fruits (Caraka Vimanastana I:25; Sharma and Bhagwan Dash II 2005, p114).

Caraka is specific regarding quantity. Caraka Sutrasthana V:4 notes that food consumption must equal what the body can digest while maintaining equilibrium of dosa and dhatu (Sharma and Bhagwan Dash 2006, p106). In Vimanasthana II:3, he states that the capacity of the stomach should be divided into three equal parts: (a) food, (b) water and (c) left empty for the dosas (Sharma and Bhagwan Dash 2005 II, p132). He further notes that even if foods are light they should not be consumed in

excess (Sharma and Bhagwan Dash 2005, p106-107). As discussed, RMS sufferers will have low agni and therefore must not overeat.

Vitiated vata requires routine to balance it. Astanga Hrdayam recommends maintaining a daily routine (Appendix 7) involving rising, washing and grooming, exercise, body massage and eating as the same time each day (Murthy 2004, p22). Caraka Suthrastana (VI) recommends a seasonal routine (Appendix 8); maintaining consistency on daily and seasonal basis are essential components of Ayurvedic lifestyle (Sharma and Bhagwan Dash 2006, p130).

Caraka is clear that one must only exercise to half of one's capacity. In Nidanastana I:19, he notes that physical exercise will aggravate the vitiation of vata. Therefore, an RMS sufferer must not over exercise or be hurried or rushed in any of their activities (Sharma and Bhagwan Dash 2005 II, p18). Other lifestyle considerations are a regular oil massage as advised by Caraka Suthrastana V:88-92 (Sharma and Bhagwan Dash 2006, p125). Sesame oil is especially beneficial for aggravated vata and its moisturising and warming effects have a natural affinity to sooth vata's dry, rough, cold and light qualities (Lad 2002, p31). Frawley (1998, p201) explains that oil massage is beneficial not only for the body but also calms the mind, nurtures the heart and strengthens the bones and nerves.

Ayurveda's treatment modality can be divided into two main categories: (1) pacification therapy and (2) purification therapy (Singh 2007, p6). The diet and lifestyle aspects focus on pacification therapy - specifically pacifying vitiated vata and building depleted ojas. Purification therapy consists of a series of mind and body treatments called Pancakarma. Pancakarma therapy further subdivided into:

(1) Purvakarma or preparatory remedies such as Snehana (oleation) and Swedana (fomentation). Oil massage would be categorised as an oleation treatment.

(2) Pradhanakarma or primary measures are Vamana (emesis), Virecana (purgation), Anuvasana (oil enemas) and Asthapana (medicated enemas).

(3) Pascatakarma, a post therapy diet and lifestyle regime (Singh 2007, p7).

A detailed discussion of Pancakarma therapies is not within the scope of this paper. However, a customised Pancakarma treatment plan will complement the diet and lifestyle strategies discussed so far and would optimise the treatment plans of an RMS sufferer.

3.5.2 Herbal Supplements

Similar to pancakarma, herbal supplements (herbs) will compliment diet and lifestyle regimes. Frawley (1998, p195) explains that a diet and lifestyle regime is the foundation of an Ayurvedic treatment plan. Herbs will augment the diet and lifestyle platform, fine tuning and increasing the therapeutic action.

Caraka Suthrastana IV:8 enumerates 50 groups of herbs for various categories of illness (Sharma and Bhagwan Dash 2006, p86). The first is Jivaniya or life promoting. This category of herb will be ideal to treat depleted ojas as is the case with RMS sufferers. Most of these herbs mentioned in the text are extinct. However, substitutes have been found with similar pharmacokinetic properties. Other categories applicable to RMS sufferers are Vrmhaniya (strength promoting), Balya (strengthening), Trptighna (ama reducing), Sonita (blood stabilising), Praja or Vajikarana (fertility improving). Caraka list two other categories for males: spermatogenesis – sukra janana - and cleaning sperm – sukra sodhana.

Table 4: Selection of Common Herbs

Vata	Amalaki, ashwagandha, bala, garlic, licorice, shatavari, vidari
Pitta	Amalaki, aloe gel, bala, gotu kola, red coral, licorice, lotus seeds, shatavari
Kapha	Aloe gel, ashwagandha, elecampane, garlic, guggul, myrrh, pippali, shilajit
Rejuvenation for the mind	Calamus, gotu kola, manduka parni, shankha pushpin
Acidity – sooth	Licorice, amalaki, shatavari, mustaka, cardamom,

inflammation, clear heat, reduce burning	haritaki, psyllium, rhubarb root, rose, peppermint, sandalwood
Bleeding – internal	Manjishtha, rhubarb root, turmeric, bilva, kushtha, safflower
Depression – awaken mind, clear stagnation, increase ojas	**Damp type:** vacha, turmeric, chitraka, ginger, punarnarva, gotu kola **Nervous type:** tagarah, jatamamsi, brahmi, gotu kola, tulsi, ashwagandha **Hot type:** guduchi, daruharidra, rhubarb root, brahami oil nose drops, shatavari
Immunity – tonify ojas, strengthen all tissues	Ashwagandha, garlic, licorice, turmeric, myrrh, bala, shatavari, safed musali, ghee
Impotence	**Obstructive type:** guggulu, arjuna, frankincense, pippali, turmeric, ginger, gokshura **Deficient type:** ashwagandha, bala, vidari kanda, kapikacchu, safed musali **Hot type:** guduchi, shatavari, saffron, amalaki, kapikacchu, aloe vera
Menses – stop pain, regulate flow, clear cysts, fibroids, reduce premenstrual syndrome	**Obstructive damp type:** ginger, ashoka, saffron, punarnava, gokshura, myrrh, triphala guggulu, pusyanuga curna **Nervous type:** jatamamsi, tagarah, ginger, ashwagandha, vidari kandha, dashmoola **Heat type:** musta, aloe vera juice, shatavari, kaisor guggulu, phala grta, coconut oil

(Frawley 1998, p199; Pole 2006, p335-339, Sharma and Bhagwan Dash 2006, p86-101)

Traditionally, Ayurveda has used compound herbal formulas in its treatment strategy rather than single supplement herbs - emphasising its holistic treatment strategy opposed to symptomatic relief. Appendix 9 lists a selection of compound formulas for gynaecological problems.

3.5.3 Safety of Ayurvedic Treatment

In 2000, the House of Lords select committee on complementary and alternative medicine criticised both Ayurveda and Traditional Chinese Medicine for appearing unscientific (Lord Walton, 2000). The government's response has been to initiate regulation of practitioners and herbs. These changes are expected to be implemented by 2012 (UK Department of Health 2001).

Caraka Suthrastana XVI:1-12 explains the importance of using only qualified physicians in Ayurvedic treatment. The commentary notes that over, under or incorrect administration of medicaments will cause severe debilitation in the patient. In Suthrastana IX: 15-17 Caraka condemns "quack" physicians and says: "it is better to die than to be treated by a physician ignorant of the science of medicine" (Sharma and Bhagwan Dash 2006, p188). Caraka's codes of conduct for physicians are in keeping with current medical ethics.

When using herbs it is important not to assume that 'natural' substances are 'naturally' non-toxic (Williamson 2002, pxi). Some RMS sufferers may naively assume that supplementing biomedicine with 'natural' herbs may increase the probability of a live birth. However, this kind of augmentation can lead to drug-herb interaction impairing the foetus. This highlights problems associated with self-medication currently prevalent with the free availability of over the counter herbal supplements. The assessment of herbal contra-indication, precautions and potency of 'natural' herbs is essential. Especially in pregnancy, it is advisable not to consume herbal supplements without qualified medical advice. Ayurvedic treatment protocol for RMS must be administered prior to conception.

3.6 Comparative Analysis

Middeldorp (2007, p276) - in his paper "Thrombophilia and pregnancy complications: cause or association?" - questions the causal relationship between RMS and thrombophilia. He claims that the evidence is limited for the treatment success of APS

with aspirin and low molecular weight heparin even though this protocol is often suggested for RMS suffers. Further, he believes that RCT performed in the past have lacked adequate rigor as they have not used placebo comparators. The latter naturally encompass the ethical dilemma of offering an RMS sufferer a treatment protocol that is in actual fact a placebo. In addition, the first RCT was initiated by the team who developed the aspirin/heparin protocol and thus the results may reflect research and clinical bias. Quenby (2002, p170) suggests that the intense desire of clinicians and RMS sufferers to find a viable solution has led to investigations and therapies with low scientific validity. She further confirms that to date the only valid RCT was for the treatment of APS with aspirin/heparin protocol. Middeldorp (2007, p276) suggests that such a RCT with placebo group is currently underway. The alarming factor remains that an intervention is carried out with pregnant women that could have serious side effects for the mother and baby with limited evidence of its efficacy.

Ayurveda's treatment protocol for RMS, by contrast, has yet to be scientifically tested. There were no journal articles available on the topic and the classical texts do not specifically define this syndrome or recommend a treatment strategy. Most importantly, Ayurvedic treatment requires time and a significant change to lifestyle – thus potentially taking years to implement. The classical texts are precise in their direction on changing of habits and lifestyle. Caraka Suthrastana VII: 38 recommends eliminating unwholesome practices by slowly increasing wholesome diet and lifestyle practices (Sharma and Bhagwan Dash 2006, p154). Further, Vagbhata Suthrastana III:58 notes that giving up practices that have become habitual can lead to disease as there is a natural asatmya (non habituation) – thus the need for gradual introduction of wholesome practices requiring time (Murthy 2004, p44). However, even small changes in diet and lifestyle can have significant benefit.

Interestingly, as shown in this paper, both biomedicine and Ayurveda agree that RMS, especially the thrombophilic aetiology, involves the physiological and psychological aspects of the RMS sufferer and the weakening of the immune system of these women.

3.7 Future Research

The principal challenge in writing this paper has been the lack of scientific journal articles addressing Ayurveda's approach to RMS. For this reason, classical texts were used. However; these texts neither define the aetio-pathogenesis of RMS nor explicitly provide a treatment plan. Ayurveda's diagnosis and treatment strategy is holistic, isolating the underlining mechanism of aetiology using its fundamental principles, before the manifestation of signs and symptoms associated with a disease. Ayurveda would first treat the underlying reasons for the vitiation of vata and depleted ojas of the RMS sufferer rather than the arthava - female reproductive tissues. After diagnosis, the treatment strategy is individualised on a case by case basis rather than being based on macro-level protocols. This differentiates Ayurveda in its approach from biomedicine. However, to be recognised as valid medical system in the current context, Ayurveda's ancient knowledge must withstand the rigors of the present scientific paradigm. As such, with specific reference to RMS, the following research is suggested to increase the scientific body of knowledge underpinning the Ayurvedic approach.

It is suggested that an in-vitro experiment using dated blood samples is performed employing the following variables to isolate their independent anticoagulant properties. Research design will have to detail the specifics of the study but it is suggested that salicylic acid - the original substance of aspirin – and fresh turmeric and amalaki in equal parts be tested against aspirin for their anticoagulant efficacy. Srivastava, Bordia and Verma (1995, p223) found that curcumin, an active ingredient of turmeric, inhibits platelet aggregation. Bhavamisra (Bhavaprakasa - Murthy 2004, 164) states that amalaki mitigates all three dosas but is especially effective at attenuating vitiated vata as well as curing bleeding diseases. Amalaki is known to increase agni and raise the quality of one's consciousness and overall feeling of wellbeing (Pole 2006, p126). Research design will have to ensure that the bioavailability of each of the active ingredients is equitably compared. Dated blood samples will already have an anticoagulant factor present. Therefore, deciphering baseline criteria will be important.

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APPENDICES

Appendix 1: BMJ's Resources for Authors

How to prepare BMJ original research articles (full versions)

Here is all the information you need:

No word limit

We do not set fixed limits for the length of BMJ research articles and can be flexible. Nonetheless, please try to make your article concise and make every word count. Think hard about what really needs to be in the paper to get your message across accurately and what can be left out. You will be prompted to provide the word count for the main text (excluding the abstract, references, tables, boxes, or figures) when you submit your manuscript.

Title page

This should give the title of the article, including the study design. Please give for each author his or her name and initials, full address including postal code and one main work position (job title) at the time of writing the paper. We do not need authors' qualifications. For the corresponding author please provide an email address and the best contact address: this may differ from his or her work address.

Overall style

Original research articles should follow the IMRaD style (introduction, methods, results and discussion) and should have a structured abstract, a structured discussion, and a succinct introduction that focuses on the background to the research question.

Structured discussion

Please ensure that the discussion section of your article follows this overall structure, although you do not need to signpost these elements with subheadings:

- statement of principal findings

- strengths and weaknesses of the study
- strengths and weaknesses in relation to other studies, discussing important differences in results
- meaning of the study: possible explanations and implications for clinicians and policymakers
- unanswered questions and future research

(http://resources.bmj.com/bmj/authors/types-of-article/research 2009)

Appendix 2: Nidana Panchakam

Nidana Panchakam (five means of aetiology)
Nidana –aetiology and diagnosis of disease also know as: nimitta, hetu, pratyaya, utthana and karana 1. Sunnikrusta (immediate) Nidana 2. Viprakrusta (distant) Nidana 3. Pradhana (primary) Nidana 4. Vyabhicara (minor or secondary) Nidana
Purvarupa (prodromal) signs and symptoms which appear earlier to actual disease and not specifically assignable to a specific dosa/dosas
Rupa (cardinal) these signs and symptoms manifest later and are specific features of the disease (where biomedicine diagnosis of disease will normally commence)
Upasaya (process of elimination via diagnostic test) administration of medicine, food or activity which bring about sukha to patient therefore helping in diagnosis
Samprapti (pathogenesis)

(Lad 2006, p4; Murthy 2005, p3; Murthy 2003, p9; Sharma and Bhagwan Dash 2005, p477)

Appendix 3: Samprapti or Kriyakala of Disease

Kriyakala
Sancaya (accumulation) dosa increase slightly in their own site: Vata in pakwasaya, Pitta in amasaya and nabi and Kapha in uras. Body's natural defence mechanism is in action and it will crave foods with opposite taste in an effort to heal itself.
Prakopa (provocation) dosa increases further and spreads to its other sites. Negligence of appropriate action or continuation of the diet and lifestyle will lead to the next stage of abnormality.
Prasara (spread) dosa spread from its own site to the sites of Kapha and Pitta. The intersection between this stage and Stana Samsraya corresponds to Purvarupa from Nidana Panchakam. Vata is required for movement however increase in vata will show symptoms of Vimargagamana and atopa. As well as vata dosa needs to combine with rasa dhatu move around the body. Further taste is perverted; craving similar tastes versus opposite as in Sancaya. Symptoms in this stage are obvious and patient will feel the need to visit physician as they will have some difficulty carrying on daily routine
Sthana Samsraya (deposition or localisation) continued mithyahara vihara will further increase the dosa especially if agni is low and finds locations in the body that are weak – khavaigunya. The dosa will continue to infiltrate successive dhatu such as well as mala. This is called dosa-dusya sammurchanna where the body manifest symptoms of distress
Vyakti (manifestation) if proper treatment is not undertaken in the 4th Kriyakala the abnormalities get further aggravated and disease with its characteristic symptoms is manifested. This stage corresponds to Rupa of Nidana Panchakam and is the stage at which traditionally biomedicine will diagnose a disease.
Bheda (complications and structural changes) if the dosa undergoes further increase then there are abnormal changes that impact the dosa, dhatus and srota. These changes are usually unpredictable, profound and generally irreversible

(Murthy 2004, p157; Murthy 2003, p91; Lad 2006, p25; Murthy 2004, p170 – Astanga Hrdayam; Murthy 2005,pxix)

Appendix 4: Four Types of Srota Dustis

Srota Dustis
Atipravrtti - excess flow, overflow, increased function
Sanga or Rodha - stagnation, accumulation, obstruction, decreased function and consequential increase in size
Sira granthi - dilation, formation of new growth, swelling, thickening
Vimarga gamana - movement of materials in wrong direction, passage or place, false passage

(Lad 2002, p184; Murthy 2003, p81; Murthy 2005, pxxi)

Appendix 5: Attributes of Pancha Mahabhuta

Mahabhuta	Quality	Predominate Taste	Availability	Delivers	Function in Body
Prithvi - Earth	Coarse, gross, solid, dull, stable, heavy, non-slimy and hard	Sweet and slightly astringent	Rice, wheat, lentils, vegetables, corn, oats, millet and other grains	Stability, strength, heaviness, good musculature and compactness of body	Forms cell membranes and muscles
Ap – Water	Liquid, cold, unctuous, heavy, dull, mobile, thick, soft and slimy	Sweet, slightly astringent and salty	Water, milk, buttermilk, fruit juices, soups, ghee	Unctuousness, pleasing, oozing, binding of tissues, moisten, exhilarate and strengthens body	Forms tissues fluids such as plasma, lymph, blood and fluid parts of muscle, fat and seamen
Tejas – Fire	Hot, sharp, subtle, dry, rough, light and clear	Pungent, slightly sour and salty	Spices: green chillies, red chillies, peppers, black peppers, ginger, garlic	Produces digestive juices and enzymes	Responsible for vision, lustre, colour and complexion

Mahabhuta	Quality	Predominate Taste	Availability	Delivers	Function in Body
Vayu – Air	Subtle, dry, rough, cold and clear	Astringent and slightly bitter	Nuts, lentils, legumes and dried fruit	Lightness, dryness, roughness, movement, cleansing and tiredness of the body	Forms skin, parts of bones, nerves, ears and sense organs
Akasa – Ether	Subtle, smooth, light, soft and clear	Mild or un-manifested	Roasted grains	Softness, lightness and hollowness of body	Forms pores of cell membranes and cavities of organs

(Athique 2008)

Appendix 6 –

Food Guidelines for Basic Constitutional Types

Appendix 7: Dosa Variability

Dosa Predominance	**Time of Day**	**Time of Digestion**	**Time of Life**
Vata	Afternoon: 2pm-6pm Late Night: 2am-6am	End of digestion of food	Old Age after 60 years
Kapha	Early Morning: 6am-10am Early part of Night: 6pm-10pm	Early period of digestion	Early Age from birth to 16 years
Pitta	Mid Morning: 10am-2pm Mid part of Night: 10pm-2am	Middle period of digestion	Middle Age between 20 and 60 years

(Astanga Hrdayam Murthy 2004, p22)

Appendix 8: Seasonal Variation

Dosa	**Sancaya (accumulation)**	**Prakopa (Aggravation)**	**Upasama (Pacification)**
Kapha	Winter	Spring	Summer
Vata	Summer	Rainy season	Autumn
Pitta	Rainy season	Autumn	Winter

(Murthy 2004, p33; Sharma and Bhagwan Dash 2005 II, p130)

Appendix 9: Compound Formulas for Gynaecological Disorders

Disorder	Formula	Dosage
Infertility	Phala ghrita	5mL two times/day after meals with equal water
	Satavari kalpa	5-10g two times/day with warm milk
	Kumaryasavam	15-20mL two times/day after meals with equal water
	Ashokarishtom	15-20mL two times/day after meals with equal water
	Jeevaniya rasayana	5-10mL two times/day with milk or warm water
Menopausal Syndrome	Ashokarishtom	15-20mL two times/day after meals with equal water
	Satavari kalpa	5-10g two times/day with warm milk
	Panchagavya ghrita	5-10mL two times/day with warm milk or warm water
	Kalyanaka ghrita	5-10mL two times/day with warm milk or warm water
	Chandanasavam	15-20mL two times/day after meals with equal water
	Chyavanaprasha	5-10g with warm milk one/day in the morning
Gynaecological Disorders in General	Ashokarishtom	15-20mL two times/day after meals with equal water
	Pushyanuga choornam	3-5g two times/day with rice water
	Kumaryasavam/ Kumari kalpa	15-20mL two times/day after meals with equal water
	Phalakalyanaka ghrita	5-10mL two times/day with warm milk or warm water

(Mishra 2004, p556)

Appendix 10 –
Ethics Committee Approval Letter

Appendix 11 –

Dissertation Module Learning Log