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Monkeypox

The world is anticipating a new disease related challenge, if is not nip it in the bud, it may create a worldwide health havoc ie, the emergence of monkeypox. In India latest cases concern, Kerala has reported 5 monkeypoxes and one related to death. In the meantime New Delhi, 3 cases have been reported[1].

A vaccine was recently approved for preventing monkeypox. Some countries are recommending vaccination for persons at risk. Many years of research have led to development of newer and safer vaccines for an eradicated disease called smallpox, which may also be useful for monkeypox. One of these has been approved for prevention of monkeypox. Only people who are at risk (for example someone who has been a close contact of someone who has monkeypox) should be considered for vaccination. Mass vaccination is not recommended at this time.

While the smallpox vaccine was shown to be protective against monkeypox in the past, current data on the effectiveness of newer smallpox/monkeypox vaccines in the prevention of monkeypox in clinical practice and in field settings are limited. Studying the use of vaccines for monkeypox wherever they are used will allow for rapid generation of additional information on the effectiveness of these vaccines in different settings.

The monkeypox is another example of viral zoonotic disease by the monkeypox virus which can spread from animals to humans and between people. The natural reservoir of monkeypox has not yet been identified, though are most likely some species of rodents. Monkeypox is a viral disease that originated in animals in West and Central Africa.

Eating uncooked or inadequately meat and other animal products of infected animals is a possible risk factor. Since 1970, human cases of monkeypox have been reported in 11 African countries–Benin, Cameroon, the Central African Republic, the Democratic Republic of the Congo, Gabon, Côte d'Ivoire, Liberia, Nigeria, as well as The Republic of the Congo, Sierra Leone, and South Sudan[2].

Cases have been reported from the United Kingdom (n=108), Canada (n=11), the United States of America (n=7), United Arab Emirates (n=3), Argentina (n=2), Switzerland (n=2), Israel (n=1) and Thailand (n=1).

Monkeypox can occasionally be deadly, especially in poor places with inadequate healthcare, and is closely related to smallpox, which plagued humans for millennia. Smallpox was eradicated due to a worldwide vaccination campaign. In the United States, mass vaccinations ended in 1972, but the vaccines remain stockpiled. Monkeypox has been known since the late 1950s.

Monkeypox and smallpox are in the same class of viruses. They share cross-immunity, which means protection against one confers protection against the other. In particular, vaccinations developed to protect against smallpox can provide protection against monkeypox too. There is overlapping in clinical symptoms. Both are associated with fever, swollen lymph glands, fatigue, and a vesicular rash – a rash with little blisters, which may be distributed anywhere on the body, and which is easily confused with chickenpox. Fortunately, the biggest difference is that monkeypox is much less disfiguring and deadly than smallpox, and in particular, the Western African strain of monkeypox which is circulating now is less pathogenic than the strain found in Central Africa.

A multi-country outbreak of monkeypox is currently underway in places where the virus has not been typically found before, in Europe, the Americas, Africa, the Western Pacific, and countries of the Eastern Mediterranean. More cases than normal have been reported in 2022 in parts of Africa that have previously reported cases, such as Nigeria, the

Democratic Republic of the Congo, and the Central African Republic. WHO is working with all affected countries to enhance surveillance and provide guidance on how to stop the spread and how to care for patients.

Monkeypox has been reported in some African countries in the years before this outbreak began. These include Cameroon, the Central African Republic, the Republic of the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Gabon, Liberia, Nigeria, and Sierra Leone. Some of these countries only had a few cases and others have had persistent or recurrent outbreaks. Occasional cases in other countries have been linked to travel from Nigeria. The current outbreak affecting many countries at once is not typical of previous outbreaks.

Symptoms of monkeypox typically include fever, intense headache, muscle aches, back pain, low energy, swollen lymph nodes and a skin rash or lesions. The rash usually begins within one to three days of the start of fever. Lesions can be flat or slightly raised, filled with clear or yellowish fluid, and can then crust, dry up and fall off. The number of lesions on one person can range from a few to several thousands. The rash tends to be concentrated on the face, palms of the hands and soles of the feet. They can also be found on the mouth, genitals and eyes. Symptoms typically last between 2 and 4 weeks and go away on their own without treatment. However, younger people are unlikely to have been vaccinated against smallpox because smallpox vaccination stopped worldwide after smallpox became the first human disease to be eradicated in 1980. Even though people who have been vaccinated against smallpox will have some protection against monkeypox too, they also need to take precautions to protect themselves and others. It most often spreads between humans through contact with disease lesions, or through exhaled respiratory droplets during prolonged close contact. Newborns, children and people with underlying immune deficiencies may be at risk of more serious symptoms and death from monkeypox. Health workers are also at higher risk due to longer virus exposure.

In the early fifties, global population took serious interest about fighting polio. For strong endeavour to make vaccine against, research laboratories in America and Europe needed an army of Rhesus monkeys for procuring live cells and as well testing efficacy of the vaccines. In 1958 a vaccine research laboratory in Denmark, observed a strange smallpox like disease in monkeys procured from Malaysia. On investigation, it was found that it was caused by a brand new virus, accordingly, disease was named by scientists monkeypox. A severe outbreak of moneypox occurred from 1958 to 1968 in monkeys collected from Asian countries such as monkeys of Indonesia, India and Malaysia which tested negative for monkeypox antibody. So initial idea that virus reservoir is in Asian countries who supply monkeys for experimental production of vaccines[3].

The mystery of virus origin was confirmed in 1970 after the first case of monkeypox was diagnosed in subject in erstwhile Zaire, presently known as Democratic Republic of Congo in Central Africa and subsequently 7 species of monkey and 2 species of squirrels had monkeypox antibody in their blood. It was inferred that Asian monkeys were infected during the transit with African monkeys.

In 1967 global smallpox eradication programme was started. After three years of this endeavour, monkeypox came into surface which confused the investigator because the two diseases were similar that if the monkeypox spreads from its origin, eventually it can be a failure of the purpose ie, the programme of eradication[4].

Later on it was observed that the virus is a slow spreader because monkeypox confined itself to its natural reservoir in rain forests of Central and Westerrn Africa particularly Nigeria, Sierra lion, and Ivory cost. Outbreak of monkeypox mainly occurred in small villages inside tropical rain forests where the people lead a life of hunter gatherer and have frequent contact with wild animals particularly, the reservoir of the virus. Later on it was pointed out in 1989

that monkeypox was not very contagious in human referred in a book "The Orthopox Viruses" written by scientists, Frank Fenner, Riccardo, Wittek and Keith Dumbell[5].

Next scenario is "spreading of monkeypox in the United States". In 2003, during May and June, 82 cases of the disease were reported. A family in Wisconsin and in another case a boy were contracted with the disease. It was detected every case in the USA, started from contact with prairie dog (rodent).

References:

1. Abhilash Gour; Times of India. Times Global, 1st June 2022
2. Jefrey Norris. How Dangerous is Monkey Pox? UCSF's Seth Blumberg Explain.Research May 26th 2022.
3. Timothee L. Kinkelac, Seth Blumbergb,e, Henri A. Thomasseng, Brian L. Pikeh, Joseph N. Fairh, Nathan D. Wolfeh, Robert L. Shongoi, Barney S. Grahamj, Pierre Formentyk, Emile Okitolondac, Lisa E. Hensleyd, Hermann Meyerl, Linda L. Wrightm, and Jean-Jacques Muyemben a. Major increase in human monkeypox incidence 30 years after smallpox vaccination campaigns cease in the Democratic Republic of Congo. PNAS. 16262-16267 | PNAS | September 14, 2010 | vol. 107 | no. 37
4. Jhon Cohen: doi: 10.1126/science.add2880
5. Frank Fenner, Riccardo, Wittek and Keith Dumbell.Book;Orthopox Viruses.Academic Press,1st Edition, 1989.

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Effect of Neodymium: Yttrium – Aluminium Garnet (Nd: YAG) Posterior Capsulotomy on Anterior Chamber Depth and Refractive Status – A Prospective Clinical Study

Ayan Mitra[1], Rinki Saha[2], Subhadip Sarkar[3], Mukul Chandra Biswas[4]

Abstract:

To determine changes in the intra-ocular lens position after neodymiun:yttrium-aluminium garnet (Nd:YAG) posterior capsulotomy by measuring anterior chamber depth and refraction both–spherical equivalent and cylinder, a prospective observational study was carried out comprising 73 eyes of 70 pseudophakic patients who presented with diminution of vision after cataract surgery due to formation of posterior capsular opacification in the outpatients department of KPC Medical College and Hospital. They underwent Nd: YAG laser posterior capsulotomy at another eye hospital with visuals YAG III (Carl–Zeiss). Anterior chamber depth and refractive status of the patients were measured by Topcon ALADDIN (Tokyo) and automated refractometer (Topcon RM- 800) before laser and 1 hour, 1 week and 3 months postlaser.

Anterior chamber depth was decreased following capsulotomy which was statistically significant in 1 week and 3 months (p=0.006 and 0.009 respectively) mean difference –0.215mm and –0.239 respectively. But both forward intra-ocular lens movement (48 patients) and backward intra-ocular movement (25 patients) were found.

Spherical equivalent was decreased progressively. Mean pretreatment anterior chamber depth was –1.236, 1 hour –1.129, 1 week –1.034, 3 months –1.012 respectively but difference was very low between 1 week and 3 months. Cylinder did not show any statistically significant difference.

Statistically significant changes were found in anterior chamber depth and spherical equivalent but their magnitudes were very small to cause inconvenience to the patient. New spectacles if needed should be given at the end of the 1st week.

Key words: Neodymium:Yttrium-aluminium garnet (Nd:YAG), posterior capsular opacification, posterior capsulotomy, anterior chamber depth, spherical equivalent, spherical, intra-ocular lens.

Introduction:

Cataract is the most common cause of reversible blindness. Consequently, extracapsular cataract extraction (ECCE) with posterior chamber intra-ocular lens (PCIOL)

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procedures like phaco-emulsification or small incision cataract surgery (SICS) is the commonest performed ophthalmic surgery. Although these procedures cause much less serious side-effects like cystoid macular oedema (CME) or retinal detachment (RD), they cause significant posterior capsular opacification (PCO) in 11.8%, 20.7% and 28.4% of cases after 1, 3 and 5 years respectively[1].

PCO is the commonest cause of intermediate to long term visual deterioration after uncomplicated ECCE. The occurrence of PCO has come down significantly with better instrumentation and technique[2]. Still a considerable number of PCO, around 10% of all cataract surgeries[3] causes different visual problems like diminution of visual acuity, glare and loss of contrast sensitivity.

Neodymium: yttrium aluminium garnet (Nd: YAG) laser posterior capsulotomy is the standard treatment of PCO worldwide which is non-invasive with a success rate of over 95%[2]. Observed complications of this procedure are elevation of intra-ocular pressure, CME, RD, iritis, intra-ocular lens (IOL) pitting and cracking and IOL dislocation[4]. Some cases show change of refractive status after laser.

The purpose of this study is to know whether there is any change in IOL position and if it is then when does it stabilise. This will determine the time when postlaser refraction should be done and new glasses to be given if needed.

Materials and Methods:

Seventy-three eyes of 70 pseudophakic patients were selected for the study from the ophthalmology OPD of KPC Medical College, Kolkata in a span of 21 months between August, 2021 and April, 2021. All patients presented with visual deterioration after different time period duo to formation of PCO (confirmed by slit-lamp examination) after an uncomplicated cataract surgery. Patients who had some complications during or immediately after cataract surgery like IOL dislocation, hyphema, CME and patients who had comorbidity like diabetic retinopathy, age related macular degeneration, corneal opacity or high myopic degeneration of retina were not included in the study.

All the selected patients underwent Nd: YAG laser in posterior capsulotomy in another hospital by a single surgeon by Visulas YAG III (Carl–Zeiss Meditech, Germany) between September 2000 and December 2021 by modified round technique[5] with Abraham capsulotomy lens.

Anterior chamber depth (ACD) and refractive status were measured by Topcon ALADDIN (Topcon Inc, Tokyo) and Topcon RM 800 (Topcon Inc, Tokyo) respectively before the laser and then 1 hour, 1 week and 3

Table 1– Patient Profile and Laser Parameters

Patient profile	Parameters		
	Mean	Range	SD (±)
Age (years)	62.75	15-84	15.26
Time interval from cataract surgery to laser (months)	34.27	5-87	19.82
Total energy usage for laser (mj)	32.46	16-76	9.8
No of spots	18.26	12- 69	7.3

months after laser. The total energy delivered and no of spots given were also noted in each case.

calculated and cylinder values were calculated ignoring their axis.

Table 2 – Anterior Chamber Depth Changes at Different Intervals

Values	Anterior chamber depth at various intervals			
	Before laser	1 hour after laser	1week after laser	3 months after laser
Mean (mm)	3.402	3.376	3.187	3.163
Difference (mm)		–0.026	–0.215	–0.239
Change (%)		–0.764	–6.319	–7.025
P-value (paired t-test)		0.686	0.006	0.009

All data were analysed using 'paired' t-test and multivariate analysis. P-value <0.05 was considered to be

Results:

Table 3 – Spherical Equivalent Changes at Different Intervals

Values	Spherical equivalent in diopters			
	Before laser	1 hour after laser	1 week after laser	3 months after laser
Mean (mm)	–1.236	–1.129	–1.034	–1.012
Difference (mm)		–0.107	–0.202	–0.224
Change (%)		8.657	16.343	18.123
P-value (paired t-test)		0.021	0.018	0.024

statistically significant. Spherical equivalent (SE) was

Forty-two eyes of 40 males and 31 eyes of 30

females were studied. Mean age was 62.75 years (range 15-84 years). Out of total 73 patients 51 had phaco-emulsification and 22 had SICS. Mean interval from cataract surgery to laser was 34.27 months (range 5 to 87 months). Mean energy delivered was 32.46 millijoules (mj) and average no of spots was 18.26 (Table 1).

***Changes in ACD*:** Average ACD prelaser was 3.402 mm. Mean ACD after 1 hour, 1 week and 3 months were 3.376, 3.187 and 3.163 mm respectively (Table 2). The change at 1 hour was not statistically significant (p 0.686) but changes at 1week and 3 months were statistically significant (p-value 0.006 and 0.009 respectively). Both anterior (48 patients) and posterior (25 patients) displacement were visible. Posterior displacements were mostly below 0.18 mm.

***Refractive status changes*:** Changes in both SE and cylindrical power (axis was ignored) were studied. Mean SE before laser was –1.236 D. At 1hour, 1 week and 3 months the values were –1.129 D, –1.034 D and –1.012 D respectively. The SE showed hyperopic shift which was statistically significant in all 3 groups (p=0.021, 0.018 and 0.024 respectively) but the differences were very small (maximum 0.024 D at 3 months) (Table 3).

***Cylinder values*:** The cylinder values were studied separately to unmask any changes that could not be found by studying SE alone. The results were studied considering their signs, +ve or -ve but ignoring their axis. Mean cylinder value before laser was –1.076 D. At 1hour, 1 week and 3 months it was –1.045 D, –1.067 D and –1.038 D respectively (Table 4). None of the changes were statistically significant.

Table 4 – Cylindrical Power at Different Intervals

Values	Cylindrical power in diopters			
	Before laser	1 hour after laser	1 week after laser	3 months after laser
Mean (mm)	–1.076	–1.045	–1.067	–1.038
Difference(mm)		–0.031	–0.009	–0.038
Change (%)		–2.881	–0.836	–3.532
P-value (paired t-test)		0.837	0.986	0.743

Discussion:

Cataract surgery has come a long way from intracapsular cataract extraction to modern day phaco-emulsification with trifocal IOLs giving the patients full range of vision. As the stable in the bag positioning of the IOLs becomes more and more important for a satisfactory long-lasting visual outcome, any movement of the IOL after treatment of PCO with Nd: YAG laser will produce changes in the refractive status causing visual disturbance to the patient. So, it is important to know if refractive status changes after capsulotomy and if it does, when does it stabilise. This will determine when we should check refraction after laser.

Thornval and Naeser[6] did not find any significant change in ACD in their study. Findl *et al*[7] found a little backward movement of IOL but it was not statistically significant. Hu *et al*[8] measured ACD with a non-contact device EAS-1000 and found ACD decreases over 3 months follow-up. Zaidi and Askari[9] found anterior displacement

of IOL in their study. Bharkbhum *et al* [10] measured ACD with IOL master and did not find any significant difference in ACD in their study.

We measured the ACD by ALADDIN by Topcon which uses optical low coherence interferometry. The ACD was found to decrease in the present study which was statistically significant in 1 week and 3 months follow-up. However, both anterior and posterior IOL movement was seen but posterior displacement was very minute(<0.18 mm). Further studies need to be done by cross checking ACD by different methods.

The refractive changes postlaser was studied for both SE and cylindrical power. Thornval and Naeser[6] found SE to decrease 5 weeks after laser capsulotomy in their study but it was not statistically significant. Findl *et al*[7] found a small hyperopic shift but it was to small to be clinically significant. Hu *et al*[8] did not find any change in SE in their study. Chua *et al*[11] also did not find any change in SE. Bharkbhum *et al*[10] in their study used autorefractometer but found no significant change in SE. But they found significant change in cylinder 1 week after laser which settled down after 3 months. So, they suggested glasses to be prescribed 3 months after laser.

In this study we measured the refractive status by Topcon RM 800 (Topcon, Tokyo) and found SE to decrease in all the three follow-ups which were all statistically significant. However, the differences were very small to cause any significant effect. The 1 week and 3 months follow-up result were very close. So, we suggest refraction to be done after 1 week of laser. We did not find any statistically significant change in cylindrical power. However, we overlooked the axis of the cylinder in this study. In future better methods to compare cylindrical power changes considering its axis like vector analysis will throw more light on the effect of IOL position change on patients' cylindrical refractive status. Further studies should be done to compare displacement effect of laser on different types of IOL with a large sample size using other methods to measure ACD like anterior segment OCT and cross checking with ultrasound.

References:

1. Schaumberg DA, Dana MR, Christen WG, Glynn RJ. A systemic overview of the incidence of posterior capsule opacification. *Ophthalmology* 1998;**105**(7):1213-21.
2. Pandey SK, Apple DJ, Werner L, Maloof AJ, Milverton EJ. Posterior capsule opacification: a review of the aetiopathogenesis, experimental and clinical studies and factors for prevention. *Indian J Ophthalmol* 2004; **52**(2):99-112.
3. Bhargava R. A review of posterior capsule opacification. *Int J Ophthalmic Pathol* 2014;**3**:4Ji.
4. Stark WJ, Worthen D, Holladay JT, Murray G. Neodymium: YAG laser: and FDA report. *Ophthalmology* 1985; **92**:209-12.
5. Jin SK, Jung YC, Ji WK, Won RW, Young KH. Comparison of two Nd:YAG laser posterior capsulotomy: cruciate pattern vs circular pattern with vitreous strand cutting. *Int J Ophthalmol* 2018;**11**(2):235-9.
6. Thornval P, Naeser K. Refraction and anterior chamber depth before and after neodymium:YAG laser treatment for posterior capsure opacification in pseudophakic eyes: a prospective study. *J Cataract Refract Surg* 1995; **21**(4):457-60.
7. Findl O, Drexler W, Menapace R, Georgopoulos M, Rainer G, Hitzenberger CK, *et al*. Changes in intraocular lens position after neodymium:YAG capsulotomy. *J Cataract Refract Surg* 1999;**25**(5):659-62.
8. Hu CY, Woung LC, Wang MC, Jian JH. Influence of laser posterior capsulotomy on anterior chamber depth, refraction and intraocular pressure. *J Cataract Refract Surg* 2000;**26**(8):1183-9.
9. Zaidi M, Askari SN. Effect of Nd:YAG laser posterior capsulotomy on anterior chamber depth, intraocular pressure,and refractive status. *Asian J Ophthalmol* 2003;**5**(4):2-5.
10. Bharkbhum K, Chayata L, Piyada S. Effect of Nd:YAG laser treatment of posterior capsule opacification on anterior chamber depth and refraction in pseudophakic eyes. *Ophthalmology* 2015;**9**:557-61.
11. Chua CN, Gibson A, Kazakos DC. Refractive changes following Nd:YAG capsulotomy. *Eye (Lond)* 2001;**15** (Pt 3):304-5.

Blood Transfusion – Past and Present

Alok Bandyopadhyay[1]

Abstract:

Early contributions regarding blood explain some aspects of the old Indian and Aristotelian concepts of blood. According to Indian philosophers and Aristotle, blood is a homogeneous part of the body and produced in the heart, and then it is distributed all over the body, where it functions to nourish the different organs and to induce their growth. But this old method of blood circulation within the body was corrected by William Harvey in 1628. Afterwards, scientists put their efforts in the transfusion of blood to extend the life of human being. But this process is not perfected until the blood group was not discovered till the first part of 19th century. The major challenge at this time was to preserve the blood in blood bank. Several stabilisers were discovered up to 1979 and its shelf life reached to 42 days at room temperature.

Up to date, the blood supply is largely dependent on donations by the people. Several contaminations (eg, bacteria, virus) were found in the blood. So government took over the charge for transfusion and they published guidance to restrict the contamination in blood. In addition, a discussion is made that blood carries various specialised cells.

Key words: Blood transfusion, blood bank, Ayurveda literature, red blood cells, haemophilia, acquired immune deficiency syndrome (AIDS).

Introduction:

Today, the experiments and methods that were used in the past may seem to be crude; however it is thanks to these researchers, that we have reached the safe standards that we have today. The only thing that never changed throughout the years is the importance of blood.

Old Indian concept about blood : The central theoretical ideas of Ayurveda developed in the mid-first millennium BC, and show parallels with Sankhya and Vaisesika philosophies, as well as with Buddhism and Jainism[1-5]. Balance is emphasised, and suppressing natural urges is considered unhealthy and claimed to lead to illness[6]. For example, to suppress sneezing is said to potentially give rise to shoulder pain[7]. However, people are also cautioned to stay within the limits of reasonable balance and measure when following nature's urges[2]. For example, emphasis is placed on moderation of food intake[8], sleep, and sexual intercourse[2].

According to Ayurveda, the human body is composed of tissues (*dhatus*), waste (*malas*), and biomaterials

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[Senior global regulatory consultant, is associated with AB consulting LLC. He worked under renowned virologist Dr Joseph Melnick at Baylor College of Medicine and continued the work on retrovirus at National Cancer Institute prior to the joining in Pharmaceutical Industry. He has more than 15 years of pharmaceutical experience. He held positions at several pharmaceutical companies and has published several articles and abstracts.]

(*doshas*)[3,4]. The seven *dhatus* are plasma (*rasa*), blood (*rakta*), muscles (*mamsa*), fat (*meda*), bone (*asthi*), marrow (*majja*), and semen (*shukra*). Like the medicine of classical antiquity, Ayurveda has historically divided bodily substances into five classical elements, *panchamahabhuta* (Sanskrit) *viz*, earth, water, fire, air and ether[4]. There are also twenty *gunas* (qualities or characteristics) which are considered to be inherent in all matters. These are organised in ten pairs: Heavy/light, cold/hot, unctuous/dry, dull/sharp, stable/mobile, soft/hard, non-slimy/slimy, smooth/coarse, minute/gross, and viscous/liquid[5].

The three elemental bodily humors, the *doshas* or *tridosha*, are *vata* (space or air, equated with the nervous system), *pitta* (fire, equated with enzymes), and *kapha* (earth and water, equated with mucus). A parallel set of mental *doshas* termed *satogun*, *rajogun*, and *tamogun* control psychology. Each *dosha* has particular attributes and roles within the body and mind; the natural predominance of one or more *doshas* thus explains a person's physical constitution (*prakriti*) and personality[1-6, 9]. Ayurvedic tradition holds that imbalance among the bodily and mental *doshas* is a major aetiologic component of disease. One Ayurvedic view is that the *doshas* are balanced when they are equal to each other, while another view is that each human possesses a unique combination of the *doshas* which define this person's temperament and characteristics. In either case, it says that each person should modulate their behaviour or environment to increase or decrease the *doshas* and maintain their natural state. Practitioners of Ayurveda must determine an individual's bodily and mental *dosha* makeup, as certain *prakriti* are said to predispose one to particular diseases[4,7]. For example, a person who is thin, shy, excitable, has pronounced Adam's apple, and enjoyed of esoteric knowledge is likely *vata prakriti* and therefore more susceptible to conditions such as flatulence, stuttering, and rheumatism[4,7]. Deranged *vata* is also associated with certain mental disorders due to excited or excess *vayu* (gas), although the Ayurvedic text *Charaka Samhita* also attributes "insanity" (*unmada*) to cold food and possession by the ghost of a sinful Brahman (*brahmarakshasa*)[1-6, 9].

Ama (a Sanskrit word meaning "uncooked" or "undigested") is used to refer to the concept of anything that exists in a state of incomplete transformation. With regards to oral hygiene, it is claimed to be a toxic byproduct generated by improper or incomplete digestion[1-4]. The concept has no equivalent in standard medicine.In medieval taxonomies of the Sanskrit knowledge systems, Ayurveda is assigned a place as a subsidiary *Veda* (*upaveda*) [some medicinal plant names from the *Atharvaveda* and other *Vedas* can be found in subsequent Ayurveda literature][5]. The earliest recorded theoretical statements about the canonical models of disease in Ayurveda occur in the earliest Buddhist Canon[6,9].

Ayurveda scriptures physiology was based on the effectiveness of biological structure or anatomy. This structure-based definition of physiology shows the effectiveness of the organ. There are many compendia in the Ayurveda scriptures like pharma science, which are called *samhita* in Sanskrit. All of them were written in 400-500 BC, such as *charak*, *vela*, *sushrita*, *asthana hriday*, etc. By combining these *samhitas*, we know the definition and characteristics of old blood.

In Ayurveda literature, the heart and its associated vessels are described to transport the following four important entities: (1) "*Rasa*", which nourishes the rest of the tissue[2,3]; (2) "*Rakta*", the red fraction that is very essential for life[3]; (3) "*Oza*", a white fraction whose function is closely associated with immunity; and (4) "*Prana*", a fraction that is generated by breathing[4]. Ayurveda explains that after complete digestion, *rasa* is converted into nutrient fluid and this *rasa* is then converted into *rakta* between "*yakrit*" (liver) and "*plyha*" (spleen)[5]. The blood then enters the heart[5]. The soul arising out of breathing is this *rakta* (*karak samhita*)[5]. This *rakta* is then converted into "*mamasa*" (meat) and other physical tissues[5].

Aristotle and Gallenic concept : This contribution explains some aspects of the Aristotelian concept of blood. According to Aristotle, blood is a gay part of the body. It is produced in the hearts of the hottest animals

through nutritional "cooking", and then distributed throughout the body, where it is nothing but function to nourish various organs and induce their growth, but it also passes over the senses. In addition, the starting point of blood production in male animals – through more "cooking" – is semen. On the contrary, there is no such distortion of blood in female-gender animals, whose body cools down. Male semen acts as a form and effective cause carrier, while the female acts as a blood substance that determines the results of AG6N occurring between the two elements for its share[10].

In the book Third Book of De Generation Animaliam, Aristotle discusses the problems of the spontaneous generation, which will be of interest for centuries, to modern science[10]. The purpose is to examine this issue which is one of the most significant problems in the Aristotelian theory: the ability to self-dynamic and self-reproduce and connected to it, in nature, in Aristotelian biology, in a teletheoretical function. The last part focused on the connection between spontaneous generations and sexual reproduction, once again, highlighting the importance of telelogical as well as material aspects. The first systematic description of the blood movement came to us from Galen, a famous philosopher/physician who lived in the second century BC. Unfortunately, it was riddled with errors[10].

According to the Galenic system, blood from food is produced in the liver and flows to the right side of the heart. Some of it flows into the lungs where it provides "cotton vapour" and flows to the left side of the heart through some invisible pores, and itgains "important soul" when the trachea is mixed with *anana numa* (*pneuma*). A number of arteries flow into a fictional rate *mirabil* at the base of the brain, where the vital soul changes to the animal spirit before it spreads to the rest of the body through an empty tube called nerve, where the tissue absorbs the blood. Drug practice was built for the next 1500 years around this flawed realisation of Galen[11-14].

Concept of modern times: Galen's discovery was first challenged in the 1200s by Ibn al-Nafiz, an Arab physician who insists that there is no invisible path from the right to the left of the heart and has correctly identified the blood circulation of the lungs[15]. But Nafiz's writings were ignored until the 20th century, even in the Arab world in the 17th century and were considered a questionable theory[15,16]. It is left to William Harvey to come up with a proper idea of circulation. His first indication is that the conception in the Galenic theory is the amount of blood. He realises that if blood is really absorbed in the tissue, the liver will have to generate several times the weight of the body in the blood every day. In Harvey's experiment, he found that an animal could be completely extinct within minutes by cutting an artery. Blood supply is very limited; it had to be respread on top of it. This is what Harvey established through careful experiments – sometimes using cold-headed animals, because their circulation is much slower[17,18].

In 1628, Harvey published his De Moto Cordy, "... Since this only book supports blood to pass through the unwanted tract and go back through untimely". Harvey wrote at the time, "contrary to the path taken, over the years, and proven by numerous famous and educated people, I am afraid to give this little book... Either abroad or across the sea, lest it seem like a work full of arrogance..."[17,18].

Harvey was criticised for his actions – his medical practices were severely damaged by all his criticism. A complete practice of purity and bleeding drugs depended on Galen's system – so that it did not last for generations , so that it was his protest. Later in life, Harvey lived a life in exile, and said "Some times it's much better to be wise at home and secretly.It is better to achieve peace for the rest of the day without expressing what you have achieved with eternal labour". In ancient times, people must have realised the importance of blood. They have certainly noticed that blood loss or emptiness usually leads to death. So in ancient times, the transfer of blood from one person to another was a special attempt[17,18].

Blood Transfusion :

The first blood transfusion was reported in 1492 – the transfusion was performed on the seventh Pope Inno-

cent in Rome. His doctors recommend blood transfusions of three healthy people as a therapeutic measure for his illness. However, the results of this blood transfusion did not succeed, and the Pope died soon after. Then, in 1665, Richard Lower, an English doctor, was seen in the world of transfusions. He had been working on blood circulation for a long time. After a lot of experiments, he gathered a flock of dogs. He transferred the blood of one dog to another. Then he saw that most of the dogs had survived the transfusion[19]. This incident evoked a major response among British obstetrician James Blandelin 1818. That's when one day he observed a big incident. A mother, who was suffering from postpartum bleeding (bleeding after delivery), was selected. Her husband's blood was taken with a syringe and successfully injected into the patient. Between 1825 and 1830, he circulated blood in ten patients with this transfusion, five patients became healthy[20]. In later years he encountered two problems during the transfusion. The first was that there were frequent blood clots during the process, as no anticoagulant (a solution that prevents blood clotting) was being used until 1914. The second problem was that about half of the patients had severe reactions, some of which caused death[20].

In the early 19th century, Austrian scientist Karl Landsteiner was working on human blood. Suddenly he noticed that not all people's blood was same and found that there were three types of blood eg, A, B and O, which were designated as groups instead of types. He won the Nobel Prize in Medicine in 1930 for his discovery[21]. Two students, De Castello and Starley IV, who worked with Carl Landsteiner, discovered AB the other group of human blood. Together these four blood groups are designated as ABO blood group system. During this time, Surgeon George Washington Krill of the United States started using blood transfusions regularly during surgery and was facing excessive problems[22]. So he started working on blood groups and later in 1909 he discovered the cross-matching method of blood ie, a blood could be mixed with which blood. Following this procedure, in 1914, he was able to say that the ideal treatment for surgery is direct blood circulation or transfusion. During this time, British Military Doctor Roger Lee defined the words 'universal donor' (universal donor) and 'universal recipient' (universal acceptor). He showed that groups and blood can be transferred to any one of the four blood groups, while group AB patients can get any one of the four blood groups. As mentioned earlier, several anticoagulants were being introduced. Francis Russ and JR Turner introduced a citrate-glucose solution, added to the collected blood. As a result, blood is stored in containers and refrigerated for several days before transfusion[23].

In 1925, when Carl Landsteiner was working in New York, he discovered two more blood group systems, the MN and P blood group systems. In the same year the British Red Cross launched the world's first human blood transfusion service. The blood depot of the first hospital was later launched as 'Blood Bank', at a Leningrad hospital in Russia. The International Society of Blood Transfusion (ISBT) was established in this year. The first vacuum blood bottle is marketed by Highland. The word 'blood bank' originated by Bernard Fantas, who founded the first blood bank at Cook County Hospital in Chicago after 5 years in Russia. In later years, blood banks spread across the United States. Although the discovery of the ABO blood group system reduced dramatically the number of deaths following blood transfusion, several other transfusion reactions (such as fever) were being observed. These were caused by other blood group systems, which yet had to be discovered. The most important of these systems was the Rhesus (Rh) system. This discovery was made by Philip Levine and RE Stetson in 1939. They observed that after a mother gave birth to a stillborn child and subsequently transfused with her husband's blood, she suffered a severe reaction to the blood. Both the mother and the husband were group O. The two scientists explained the presence of a new factor as being the cause; however no name was given to it.

The name was given by Karl Landsteiner and Alex Weiner. They conducted a study in which they injected blood from the monkey 'Maccacus rhesus' into rabbits and guinea

pigs. The blood from the rabbits and the guinea pigs was then collected, and the serum (the liquid in which red blood cells flow), which contained the anti-Rh factor (a protein that binds to the rhesus antigen), was mixed with red blood cells from a number of samples from individuals of a population of New York city. Red blood cells from 85% of this population agglutinated (clumped together) with this serum. This population was called Rhesus positive (Rh- positive). The remaining 15% that did not have any agglutination were called Rhesus negative (Rh-negative). Other important blood group systems were discovered during the following years. Newborns of Rh-negative women already seen. Rh immune globulin, known as Rhogam, is introduced to prevent RH disease[24]. It is considered to be a great discovery.

Stability of Blood and Blood Bank :

Edwin Cohn, American scientist, developed a cold ethanol fractionation which is the process of breaking down plasma into components and products. Albumin, gamma-globulin and fibrinogen were isolated and became available for clinical use[25]. A technique for long-term preservation of blood plasma by separating the liquid red blood cells from the near solid plasma and freezing the two separately was also documented by Charles Drew, an American physician during this year. Cryopreservation allowed blood to be preserved and reconstituted at a later date[26].

An Army Blood Transfusion Service (ABTS) and an equipment depot – the Army Blood Supply Depot (ABSD) was set up during this year. This decision was taken by the War Office in Britain where it was also decided to blood group every member of HM Forces and issue all medical units with the equipment required to run a donor session in the field in order to obtain blood where it was needed with the minimum delay.

Acid citrate dextrose (ACD) solution, which reduces the volume of anticoagulant, permitting transfusions of greater volumes of blood and longer-term blood storage, was introduced by J Loutit and PL Mollison, London in 1943[27, 28].

The number of blood banks was increasing around the world. In the United States alone the number of hospital blood banks reached 1500 in the year of 1950. During this year one of the most important technical developments in blood banking was introduced by Carl Walter and WP Murphy Jr. They introduced the plastic bags for the collection of blood, which replaced the breakable glass bottles that were in use.The scientific research that was done in the next fifty years revolutionised blood banking. New concepts and important techniques were developing, all of which moved blood banks towards a system that took into consideration the safety of both blood donors and patients receiving their blood[28].

Due to the fact that blood banks were collecting blood from volunteers and to the increasing demand of blood, several blood banks were starting to suffer shortage in their blood supply and were not coping with the demand. Although this problem still exists today the discovery of a new anticoagulant preservative, CPDA-1 in 1979, that extended the preservation of blood to 35 days, reduced the problem.The shelf life of red blood cells increased to 42 days when a new additive, SAG-M was introduced[29].

Discrepancies for Using Blood :

Paul Beeson, American physician, published the link between blood transfusion and the occurrence of jaundice some months later of 1943 : A classic description of transfusion-transmitted hepatitis[30]. Blood banks started collecting blood from volunteers. Testing of hepatitis envelope antigen was discovered .Careful donor selection and testing of blood for transfusion-transmitted diseases were introduced which reduced the number of cases of hepatitis B contamination but a new virus hepatitis C was discovered. Similarly, testing for hepatitis C was discovered and by testing blood for hepatitis C, the contamination was reduced[31].

Afterwards, a new disease related to blood emerged known as haemophilia. It is noted that when the patient was cut, the blood was unable to clot resulting excessive bleeding. The cause of the disease and good treatment were not found. These patients required blood to extend

their life. The demand for blood is also increased. A system called cryoprecipitate had been launched to meet this demand. Within a few days, it was found that there was a special protein in the blood, called Factor-8. The haemophiliacs lack this protein and so requires this protein to sustain their lives. A few more days later cryoprecipitate method for concentrating Factor-8 was discovered[27,28].

The first cases of acquired immune deficiency syndrome (AIDS) were discovered in 1981. A paper was presented by Bruce Evatt, an American physician, suspecting that AIDS is a blood borne disease after the discovery of the syndrome amongst haemophiliacs. The first antibody test to detect HIV was quickly implemented by all blood banks to protect the patients from infections of this virus in 1985[7]. Other similar human virus human T lymphotropic virus I was detected and its antibody (anti-HTLV-I) for testing was made and introduced. At the same time HIV antigen testing was also introduced. Later on, virus for variant Creutzfeldt-Jakob disease (vCJD) was also identified. The clinical, epidemiological, neuropathological and experimental data all point to vCJD being caused by the same strain of prion as bovine spongiform encephalopathy (BSE)[7]. This is a different strain of prion from those seen in sporadic CJD. EBA was founded on the 21st September, 1998 and any national blood service based on voluntary and unpaid blood donation in a European country can be a member. The EMEA issued a CPMP Position Statement on new vCJD and plasma-derived medicinal products. Nucleic acid amplification technology (NAT) testing is introduced. Nat testing detects viruses in their early stages, ensuring blood transfusion is even safer[8].

Guidance by Agencies for Using Blood:

In 2003 EMEA issued a CPMP Position Statement on CJD and plasma-derived and urine-derived medicinal products.

European blood directive (Directive 2002/98/EC) is a new era of blood regulation(Transfusion Medicine 2004 pg257). The EMEA issued a Concept Paper on the Revision of the Note for Guidance in Plasma-Derived Medicinal Products[32].

The EBA announced its 10th Anniversary Symposium, Safe Blood for Europe, which was held in Brussels in 2009. During the EBA Board Meeting which was held in May, the EBA finalised a Position Paper on Competition in the European Blood Market. In September of 2009, the EBA was asked by the European Commission (EC) for data on the measures that were taken by blood establishments to reduce the possible impact of the influenza A/H1N1 on the European blood supply. This information was gathered from amongst EBA members. A Planning Document on Pandemic Flu was offered by EBA which is a great example of how a blood organisation could prepare itself in cases of a pandemic outbreak. A Position Paper which supports Voluntary Non-Remunerated Blood Donation was agreed by the EBA board members during its meeting[32].

The European ME Alliance (EMEA) is calling on Europe's health ministers to initiate an immediate Europe-wide prohibition of blood donation from people who have been diagnosed with myalgic encephalomyelitis (ME/CFS).This year's EBA Board Meeting which was held in Valletta, Malta, has voted and issued a Position Paper which supports the universal use of the ISBT 128 labelling, coding and identification of blood, blood components, tissues and cells[32,33].

WHO issued a blood safety fact sheet which describes the global situation about blood donation and transfusion[34].

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References:

1. Dominik W. Indian medicine. In: Gavin F, editor. The Blackwell Companion to Hinduism. Oxford: Blackwell, 2003: 394. ISBN 978-1-4051-3251-0.

2. Kaufman AB, Kaufman JC, editors. Pseudoscience: The Conspiracy Against Science. Cambridge, Massachusetts: MIT Press, 2018: 293. ISBN 978-0-262-03742-6.
3. Mukhopadhyay G. The Surgical Instruments of the Hindus, with a Comparative Study of the Surgical Instruments of the Greek, Roman, Arab, and the Modern European Surgeons. Calcutta: Calcutta University, 1913. Retrieved October 16, 2015.
4. Zysk KG. Mythology and the Brahmaization of Indian medicine: transforming heterodoxy into orthodoxy. In: Folke J, editor. Categorisation and Interpretation. Meijerbergs erminolo för svensk etymologisk forskning. Göteborgs universitet, 1999: 125-45. ISBN 978-91-630-7978-8.
5. Comba A. Carakasamhita, Sarirasthana - I and Vaisesika Philosophy. In: Meulenbeld GJ, Wujastyk D, editors. Studies on Indian Medical History. Delhi: Motilal Banarsidass, 2001: 39-55.
6. Basham AL. The practice of medicine in ancient and medieval India. In: Leslie C editor. Asian Medical Systems. Berkeley: University of California Press, 1976: 18-43.
7. CDC (Centers for Disease Control and Prevention). Recommendations for Prevention of HIV Transmission in Health-Care Setttings. MMWR 1987;**36**(SU02); 001.
8. Roth WK. History and future of nucleic acid amplification technology. *Blood Donor Testing Transfus Med Hemother* 2019;**46**:67-75. https://doi.org/10.1159/000496749
9. Patwardhan K. The history of the discovery of blood circulation: unrecognized contributions of Ayurveda masters. *Adv Physiol Educ* 2012; **36** (2): 77-82. https://doi.org/10.1152/advan.00123.2011
10. Jori A. Aristotle on the function of blood in the processes of life. *Med Secoli* 2005;**17** (3):603-25.
11. Giorgianni F, Provenza A. An entry for a "Dictionary of Genetics" generation and aspects of heredity from the presocratics to Galen: the main notions and technical terminology. *Med Secoli* 2015; **27** (3):1111-57.
12. Derenne JP, Debru A, Grassino AE, Whitelaw WA. History of diaphragm physiology: the achievements of Galen. *Eur Respir J* 1995; **8** (1):154-60.
13. Dunn PM. Galen (AD 129-200) of Pergamun: anatomist and experimental physiologist. *Arch Dis Child Fetal Neonatal Educ* 2003; **88** (5):F441-3.
14. Rescher N. New Light from Arabic sources on Galen and the fourth figure of the Syllogism. *J Hist Philosophy* 1965; **3:**27-41.
15. Rescher N. Galen and the Syllogism: An Examination of the Thesis that Galen Originated the Fourth Figure of the Syllogism in the Light of New Data from Arabic Sources including an Arabic Text Edition and Annotated Translation of Ibn al-Salah's Treatise on the Fourth Figure of the Categorical Syllogism. Pittsburgh: University of Pittsburgh Press, 1966.
16. Nasr SN. Life Sciences, Alchemy and Medicine. Cambridge: The Cambridge History of Iran, 1975; **4**:400ff.
17. Angel A. Roman-Franco MD, Mayo-Santana R. Origins of Experimental Medicine: William Harvey's 1628 Masterpiece Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus. Dept of Pathology meeting room.
18. Luke W. William Harvey's Prelectiones: the Performance of the Body in the Renaissance Theater of Anatomy. Berkeley: Representations, 1987**;17**: 62-95.
19. Tubbs RS, Loukas M, Shoja Mohammadali M, Ardalan Mohammad R, Oakes WJ. Richard Lower (1631-1691) and his early contributions to cardiology. *Int J Cardiol Netherlands* 2018; **128** (1):17-21. doi:10.1016/j.ijcard.2007. 11.069. PMID 18201782.
20. Blundell J. Observations on transfusion of blood. *Lancet* 1829; **11**:1328-9.
21. Landsteiner K, Sturli A. Hamagglutinine normaler sera. *Wiener klinische Wochenschrift* 1902; **15**: 38-40.
22. Landsteiner K, Popper E. Übertragung der Poliomyelitis acuta auf Affen. ZeitschriftfürImmunitätsforschung und experimentelle Therapie (in German) 1909; **2**: 377-90.
23. Landsteiner K. on Nobelprize.org including the Nobel Lecture, December 11, 1930 On Individual Differences in Human Blood.
24. Uhr JW, Baumann JB. Antibody formation. I. The suppression of antibody formation by passively administered antibody. *J Exp Med* 1961;**113**:935-57.
25. Cohen FS. Book Review: Edwin Cohn and the Development of Protein Chemistry. *N Engl J Med* 2003;**349**: 511-2.
26. "Patent For Preserving Blood Issued November 10, 1942; Washingtonian's invention made blood bank possible" (Press release). Brigid Quinn, United States Patent and Trademark Office. November 9, 2001. Archived from the original on February 11, 2009. Retrieved February 3, 2009. "Charles Richard Drew". American Chemical Society. Retrieved 2021-05-11
27. Fantus B. Tabellæ Dulces, sweet tablets for children's

medication. *J Am Pharma Assoc* 1914; **3** (5): 656-62. doi:10.1002/jps.3080030515.1, 1918: 249-55. doi:10.1002/jps.3080070305.
28.Fantus B. Tolu and sugar coating in the disguising of medicines. *J Am Pharma Assoc* 1918; **7**(3) : 249-55. doi:10.1002/jps.3080070305
29.Ralph V, Scott M. Platelet storage pioneer. *Transf Med Rev* 2011; **25**(2): 156-61.
30.Beeson PB. Hepatitis as a complication of blood transfusion. *Hemophilia* 1995;**1**(1):70-3. doi: 10.1111/j.1365-2516.1995.tb00043.x
31.CDC (Centers for Disease Control and Prevention). Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public-Safety Workers A Response to P.L. 100-607 The Health Omnibus Programs Extension Act of 1988. *MMWR* 1989;**38**(S-6): 3-37.
32.Directive 2002/98/EC of the European Parliament and of the Council of 27 January 2003.
33.US Department of Health and Human Services Food and Drug Administration Center for Biologics Evaluation and Research. Guidance for Industry Revised Recommendations for Reducing the Risk of Human Immunodeficiency Virus Transmission by Blood and Blood Products. April 2020 Updated August 2020. https://www.fda.gov/vaccines-blood-biologics/guidance-complianceregulatory-information-biologics/biologics-guidances or https://www.fda.gov/emergency preparedness-and-response/mcm-issues/covid-19-related-guidance-documents-industry-fda-staffand-other
34.World Health Organization. Global Status Report on Blood Safety and Availability 2016. Genera: WHO, 2016. https://apps.who.int/iris/bitstream/handle/10665/254987/9789241565431-eng.pdf

Appendix :

Centrifugation of blood – When blood is centrifuged at 1000g for 20 minutes, it separates into three components as shown in Fig1. First component is the liquid portion of blood known as plasma, bottom portions are red known as red blood cells, and in between a white buffy coat of leucocytes and platelets.

Red blood cells – Red blood cells, or erythrocytes (erythrocytes means red; cyte means cell), are special cells and spread through the body that supply oxygen to other cells. They originated from stem cells in the bone marrow. Red blood cells in mammals are small, biconcave cells that do not contain nucleus or mitochondria in maturity. Their size is only 7-8µm. In birds and non-avian reptiles, red blood cells contain a nucleus.

Red colour of blood is due to haemoglobin, a protein conjugated with iron. The main function of this protein is to carry oxygen, but it also transports carbon dioxide. Haemoglobin is packed into red blood cells at a rate of about 250 million molecules of haemoglobin per cell. Each haemoglobin molecule binds four oxygen molecules so that each red blood cell carries one billion molecules of oxygen. The human body has about 25 trillion red blood cells in five litres of blood, which can carry 25 sextillion (25×10^{21}) molecules at anytime. In mammals, the lack of organelles in erythrocytes leaves more room for haemoglobin molecules. Lack of mitochondria prevents the use of oxygen for metabolic breathing. Only mammals have anucleated red blood cells; however, some mammals (camels, for instance) have nucleated red blood cells. The advantage of nucleated red blood cells is that these cells can undergo mitosis. Anucleatedred blood cells metabolise anaerobically (without oxygen), making use of a primitive metabolic pathway to produce ATP and increase the efficiency of oxygen transport.

Not all organisms use haemoglobin as a method of transporting oxygen. Invertebrates who use haemolymphs instead of blood use different pigments containing copper or iron to bind to oxygen. Haemocyanin, a blue-green, copper-coated protein is found in mollusks, crustaceans, and some of the arthropods. Chlorocruorin, a green-coloured, iron-containing pigment, is found in four families of polychaete tubeworms. Haemerythrin, a red, iron-containing protein, is found in some polychaete worms and annelids. Despite the name, haemerythrin does not contain a haeme group; its oxygen-carrying capacity is poor compared to haemoglobin.

The small size and large surface area of red blood

cells allow for rapid diffusion of oxygen and carbon dioxide across the plasma membrane. In the lungs, carbon dioxide is released while oxygen is taken in by the blood. In the tissues, oxygen is released from the blood while carbon dioxide is bound for transport back to the lungs. Studies have found that haemoglobin also binds nitrous oxide. Nitrous oxide is a vasodilator; an agent that causes dilation of the blood vessels, thereby reducing blood pressure. It relaxes the blood vessels and capillaries which may help with gas exchange and the passage of red blood cells through narrow vessels. Nitroglycerin, a heart medication for angina and heart attacks, is converted to nitrous oxide to help relax the blood vessels, increasing oxygen flow throughout the body.

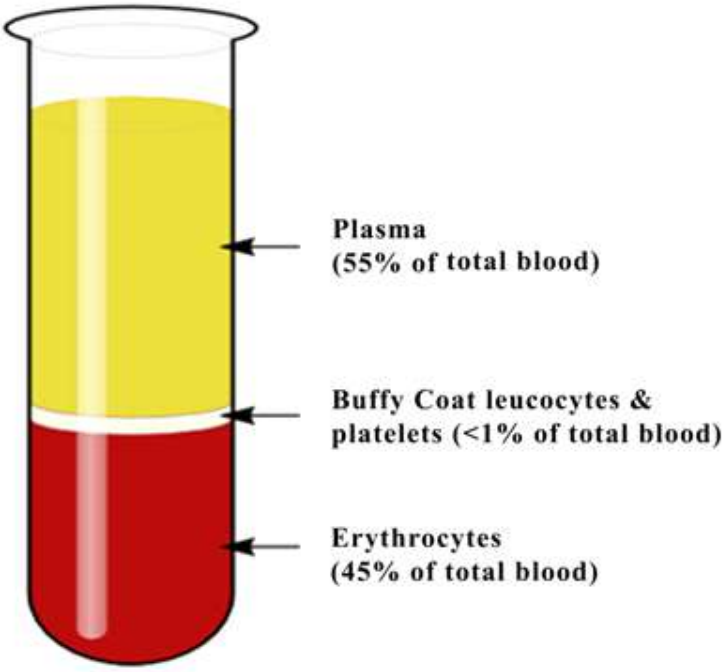

Fig 1 – Showing Components of Blood

Various oxygen-carrying proteins (Fig 2): (a) Haemoglobin in most vertebrates provides oxygen to the body and removes some carbon dioxide. Haemoglobin consists of four protein subunits, two alpha chains and two beta chains and a haem group that is associated with iron. Iron is inversely associated with oxygen; in doing so, it is oxidised from Fe^{2+} to Fe^{3+}. (b) In most molasts and some arthropods, haemocyanin provides oxygen. Like haemoglobin, haemolymph is not carried in blood cells, but haemolymph floats freely. Copper, instead of iron, binds oxygen, giving haemolymph a blue-green colour. (c) Analide, such as earthworms and some other invertebrates, carries haemerythrin oxygen. Like haemoglobin, haemerythrin is carried in blood cells and is associated with iron, but despite its name, haemitrine does not contain haem.

A characteristic of red blood cells is their glycolipid and glycoprotein coating; these are lipids and proteins that have carbohydrate molecules attached. In humans, the surface glycoproteins and glycolipids on red blood cells vary between individuals, producing the different blood types, such as A, B, and O. Red blood cells have an average life span of 120 days, at which time they are broken down and

recycled in the liver and spleen by phagocytic macrophages, a type of white blood cell.

White blood cells –White blood cells, also called leucocytes (leuco means white), make up about one per cent according to the size of cells in the blood. The role of white blood cells is very different from that of red blood cells. They are primarily involved in immune responses to detect and target germs such as bacteria, viruses and other foreign organisms. White blood cells are constantly formed; some live only for hours or days, some live for years.

The morphology of white blood cells is significantly different from red blood cells. They have nucleus and do not have haemoglobin. Different types of white blood cells are identified by their microscopic appearance after histological spots. Everyone has a different, special function. One of the two main groups is granulocyte, which contains grains in their cytoplasm, and includes neutrophils, eosinophils and basophils. The second main group is agranulocyte, which lacks grains in cytoplasm, and includes monocytes and lymphocytes.

Types of white blood cells (Fig 3): (a) Granulocyte (neutrophils, eosinophils and basophils) are characterised by a lobed nucleus and granular inclusion in cytoplasm. Granulocytes are usually the first reactive during injury or infection. (b) Agranulocytes include lymphocytes and monocytes. Lymphocytes, including B and T cells, are responsible for adaptive immune responses. Monocytes distinguish between macrophages and dendritic cells, which later respond to infections or injuries.

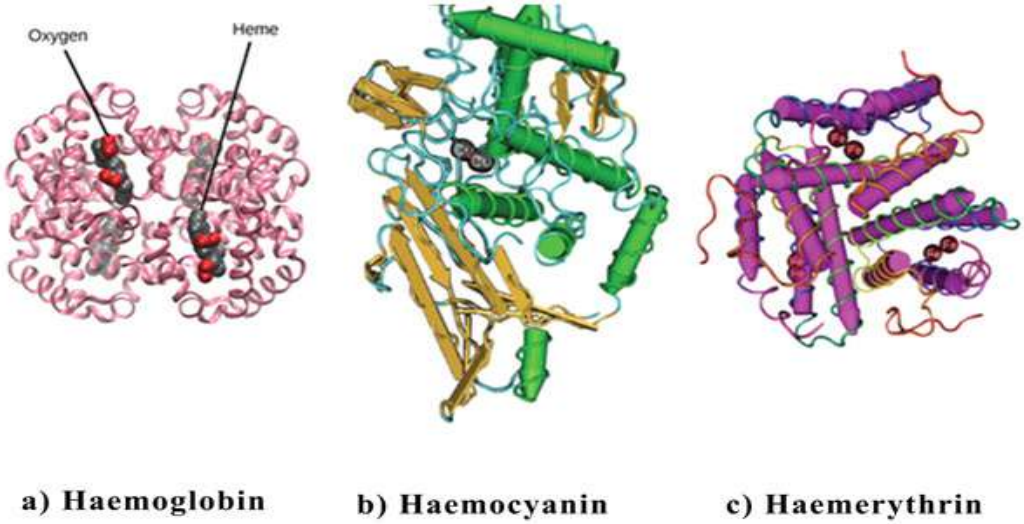

Fig 2 – Various Oxygen-carrying Proteins

Some white blood cells turn into macrophages that either remain in the same place or move through the bloodstream and gather at infection or inflammation sites where they are attracted by foreign particles and chemical signals from damaged cells. Lymphocytes are the primary cells of the immune system. These include B cells, T cells and natural killer cells. B cells destroy bacteria and neutralise their toxins; they also make antibodies. T cells attack viruses, fungi, some bacteria, transplanted cells and cancer cells. Natural killer cells attack various infectious germs and specific tumour cells.

One reason why HIV creates significant management challenges is that the virus directly penetrates through

a receptor and targets T cells. Once inside the cell, HIV then multiplies using the T cell's own genetic machinery and then it is transmitted directly from infected T cells to

Fig 3 – Types of White Blood Cells

macrophages. The presence of HIV may remain unrecognised for a wide period of time before symptoms of the entire disease develop.

Platelets and regulation factors–Blood must clot to heal wounds and prevent excessive blood loss. Small cell fragments called platelets are formed from the division of larger cells called megakaryocytes. For each megakaryocyte, each cmm consists of 2000-3000 platelets with 150,000 to 400,000 platelets present in the blood. Each platelet disc is shaped and diameter is 2-4 µm. They contain a lot of small rash, but do not contain a nucleus.

How platelets are made and how they work (Fig 4) : (a) Platelets are formed from large cells called megakaryocytes. The megakaryocyte breaks into thousands of pieces that become platelets. (b) Platelets are required for blood clotting. Platelets collect in a wound area, and form a fibrin clot that prevents blood loss and allows the wound to heal.

The internal surface of the blood vessels is aligned with a thin layer (endothelial cell) that creates chemical messengers under normal conditions that inhibit platelet activation. When the endothelial level is injured, collagen is exposed, releasing other factors into the blood stream that attract platelets to the wound area. When platelets are activated, they gather together to form a platelet plug (fibrin clot), releasing their contents. The content published by platelets activates other platelets and also interacts with other clotting factors. The causes of clotting are blood plasma proteins that respond to a complex cascad to convert fibrinogen, a water-soluble protein present in blood serum, into fibrinogen, a non-water soluble protein that strengthens the platelet plug. Vitamin K is needed to work on many causes of clotting. Vitamin K deficiency can cause blood clotting problems. Plugs or clots last for several days, stopping blood loss.

Outside the body, platelets can be activated by a negatively charged surface, such as glass. Non-physiological flow conditions (especially high value of shear pressure) can cause platelet activation caused by arterial stenosis of mechanical heart valves or blood pumps.

Stem cell –A stem cell is a specialised cell that can divide without limits as needed and, in certain circumstances, distinguish in particular cells. Stem cells are divided into several categories according to the possibility of distinguishing. The first embryo cells arising from the division of zygote are the final stem cells. These stem cells are described as totipotent as they are likely to distinguish between any cells

needed to enable an organism to grow and grow.

Embryo cells that develop from totipotent stem cells and are the forerunners of the basic tissue layers of

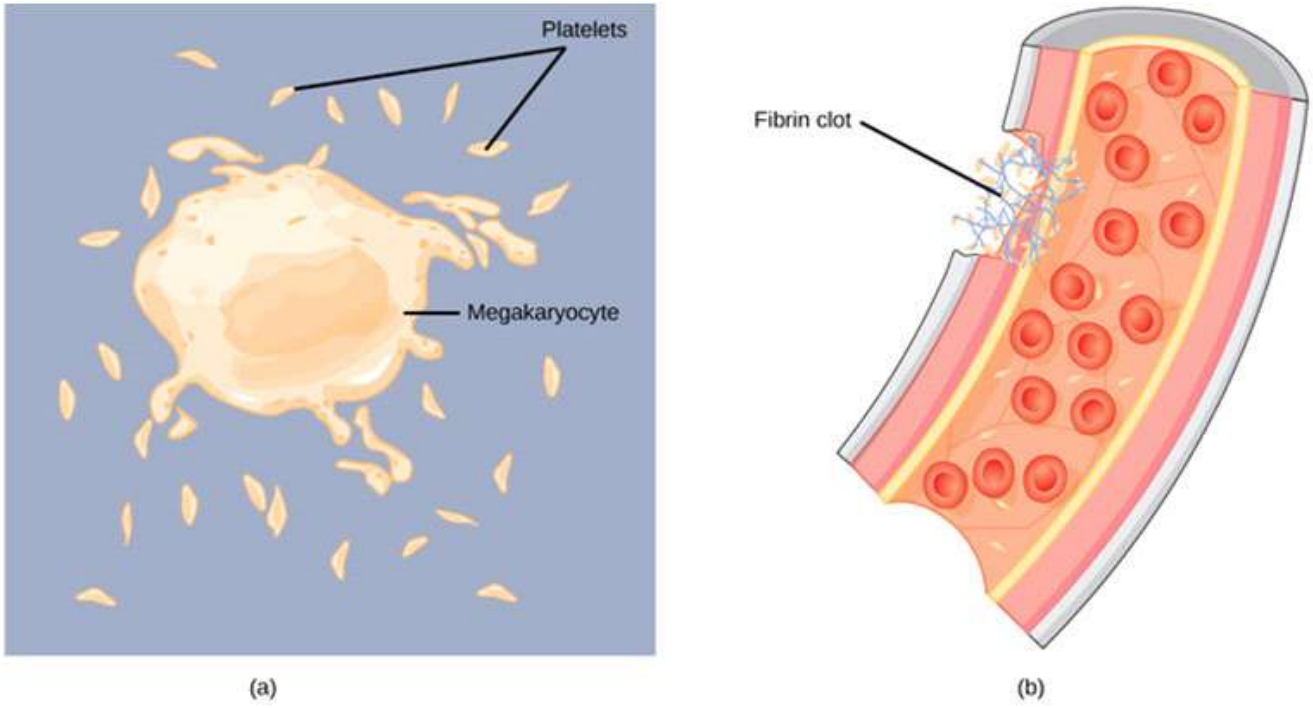

Fig 4 – Showing Platelets

the foetus are classified as pluripotent. A pluripotent stem cell is one that has the potential to distinguish between any type of human tissue but cannot support the complete development of an organism.

These cells then become a little more specialised, and are referred to as multipotent cells. A multipotent stem cell is likely to distinguish between a given cell lineage or a small number of genus in different types of cells, such as a red blood cell or white blood cell.

Finally, multipotent cells may become more specialised oligopotent cells. An oligopotent stem cell is limited to becoming one of the few different cell types. On the contrary, a unipotent cell is fully specialised and can reproduce only to generate more of its own specific cell type.

Stem cells are unique in that they can constantly divide and rejuvenate new stem cells rather than become more specialised. Different stem cells are present at different stages of human life. These include embryonic stem cells, and adult stem cells in adults. A type of adult stem cell is epithelial stem cells, which give rise to keratinocytes in multiple layers of epithelial cells in the epidermis of the skin. There are three distinct types of stem cells in the adult bone marrow: Haematopoietic stem cells, which give rise to red blood cells, white blood cells and platelets (Fig 5); endothelial stem cells, which give rise to types of endothelial cells that line the blood and lymph ducts and mesenchymal stem cells, which give birth to different types of muscle cells.

How do complex organisms like humans develop from a cell –a fertilised egg –in a large array of cells like nerve cells, muscle cells and epithelial cells that feature adults? Throughout development and adulthood, cellular difference process cells lead them to inferring ultimate morphology and physiology. The difference is the process by which unspecialised cells become specialised to perform

individual functions.

Differentiation –When a cell makes differences (becomes more specialised), it can make major changes in its size, shape, metabolic activity and overall function. Because all the cells in the body, starting with fertilised eggs, containing the same DNA, how can different cell types be so different? The answer is similar to the script of a film. The different actors in a film all read from the same script, however, each of them is just reading their own part of the script. Similarly, all cells have the same full complement of DNA, but each type of cell only "reads" parts of DNA that are relevant to its own function. In biology, it is referred to as the unique genetic expression of each cell.

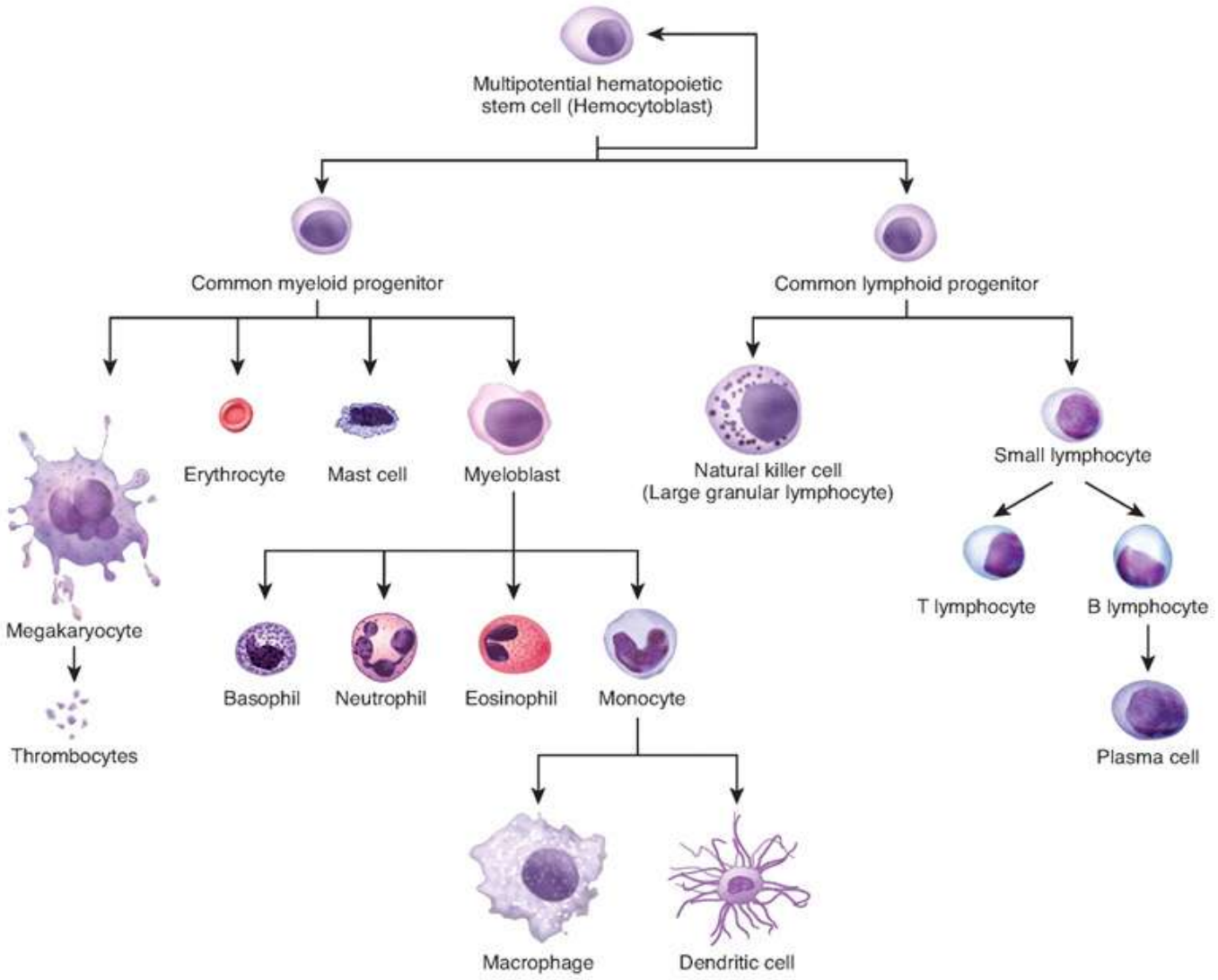

Fig 5 – Multipotent Haematopoietic Stem Cells Giving Rise to Different Cell Types

To distinguish between a cell its special form and function, it only requires that gene (and thus that protein) that will be expressed manipulated, and that will not remain silent. The initial process by which genes are "turned on" or "turned off" is through transcription factors. A transcription factor is a class of proteins that are bound to specific genes in DNA molecules and either promote or inhibit their transcription[image (link to an external site)].

Each body cell contains the entire genome of the

organism, different cells control the expression of genes with the use of different transcription factors. Transcription factors are proteins that affect the binding of RNA polymerase to a particular gene in DNA molecules (Fig 6).

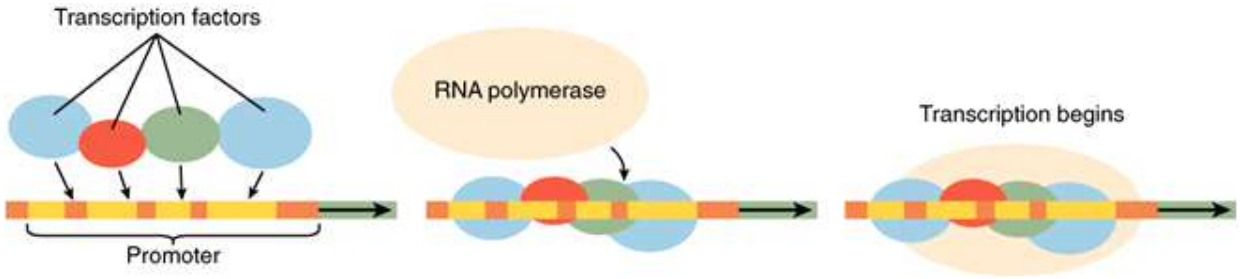

Fig 6 – Transcription Factors Gene Expression

Stem cells and some of their attributes –Stem Cell Research aims to find ways to use stem cells to revive and repair cell damage. Over time, most adult cells go through the wear and tear of old age and lose their ability to divide and repair themselves. Stem cells do not display any specific morphology or function. Adult stem cells, which exist as a small subset of cells in most tissues, continue to divide and can usually distinguish in several special cells formed by that tissue. These cells enable the body to renew and repair the body's tissues.

The processes that induce a non-separate cell to turn into a particular cell are poorly understood. In a laboratory setting, it is possible to induce stem cells to distinguish in particular cells by changing the physical and chemical state of growth. Several sources of stem cells are used experimentally and are classified according to their origin and probability of difference. Stem cells (HESCs) of human embryos are extracted from the foetus and are pluripotent. The difference in the type of cells found in the tissues is multipotent, with adult stem cells that appear in many organs and individual tissues, such as bone marrow and skin. Stem cells separated from the umbilical cord blood are also multipotent, such as cells from deciduous teeth (baby teeth). Researchers recently developed pluripotent stem cells (IPSCs) induced from mice and human adult stem cells. These cells are genetically reprogrammed multicapacity adult cells that act like embryonic stem cells. They are capable of producing three germ layer characteristic cells.

Due to its ability to divide and differentiate into special cells, stem cells provide a possible treatment for diseases such as diabetes and heart disease[image (link to an external site)]. Cell-based therapy refers to treatments where stem cells are induced to distinguish on a growth plate are injected into the patient to repair damaged or destroyed cells or tissues. Many obstacles have to be overcome for applying cell-based therapy. Although the difference in embryonic stem cells has an almost limitless range of possibilities, they are seen as foreign by the patient's immune system and can trigger rejection. Also, the destruction of embryos to isolate embryonic stem cells raises sufficient moral and legal questions. Stem cells make them potentially valuable in therapeutic applications designed to replace damaged cells of different body tissues to distinguish from special cells.

On the contrary, adult stem cells are not seen as foreign by a patient's isolated body, but they have a limited range of differences. Some people bank their child's cord blood or deciduous teeth, preserving those sources of stem cells for future use, should their child need it. Induced pluripotent stem cells are considered a promising advance in the field as they avoid legal, moral and immunological damages to the embryonic stem cells used.

Conclusions:

One of the main areas of research in biology is how cells specialise in assuming their unique structure and functions, since all cells are mainly produced from a single

fertilised egg. The difference in cells is the process of specialising with the development of the body of cells. A stem cell is a specialised cell that can divide without limits as needed and, in certain circumstances, distinguish in particular cells. Stem cells are divided into several categories according to the possibility of distinguishing. Although all somatic cells have exactly the same genome, different cell types reveal only some of those genes at any time. These differences in gene expression eventually indicate the unique morphological and physiological properties of a cell. The initial process that determines which genes will be released and which will not be released is through the use of different transcription factor proteins, which are bound to DNA and promote or inhibit the transcription of different genes. through the action of these transcription factors.

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Characterisation of Amniotic Fluid Microbiome from Caesarean Section Mothers of Term Delivery

Soumita Dutta[1], Mahabub Alam[2], Reeta Rasaily[3], Reeta Bora[4], Utpala Devi[5], Analabha Basu[6], Suman K Paine[7]

Abstract:

Arguments of developmental biology like the sterility of womb during the foetus developmental stage are now countered by recent microbiome study in placenta and amniotic fluid. Methodological advancement like next generation sequencing technology identified a series of bacteria from placenta and amniotic fluid. However studies are limited for concrete conclusions on the sterility of wombs. Present report tried to explain two important question like (a) are amniotic fluid sterile which may be a supportive data about the sterility of womb, (b) if microbiota occurs then how the pattern of host-bacteria symbiosis exists in amniotic fluid.

Human microbial diversity argued as an ancient symbiosis, maintaining homeostasis, boosting host-immunity and growth but the initiation of microbial colonisation in the womb or after the birth seems unresolved and contradictory till date due to its sparse data.

Amniotic fluids were collected from 6 pregnant women who gave term birth attending from antenatal clinics of NE India, upon written informed consent in accordance with the Institutional-Ethics-Board. The present study reveals that amniotic fluid harbours 122.8±11.82 (SD) bacteria specific OTUs among the 6 samples that range from 111 to 141.

The observation about more than 30% shared species between amniotic fluid and meconium samples which accounted for than 90% of total generated reads may signify microbial transmission of maternal-foetal during gestation may have potent impact on womb immune system and pre birth foetal microbial colonisation in the gut which may influence postnatal bacterial colonisation in the neonatal gut.

Key words: Microbiome, amniotic fluid, caesarean section, OTUs.

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Introduction:

Epidemiological studies postulates early gut microbiota perturbations and impairment of immune and metabolic maturation may signify the genesis of multiple complex non-communicable diseases as well as metabolic diseases in adulthood[1]. Understanding the developmental process on symbiotic association of host and microbes is dynamic and complex. Studies are limited but considerable reports postulate that the influence of maternal microflora derived from vagina, breast skin and breast milk may be crucial for initial shaping of neonatal gut microbiome which further significantly alters after breastfeeding tenure[2,3].

Methodological advancement like 16S metagenome sequencing through Next Generation Sequencing technology succeeds to document the presence of organ specific microbiome profile in the healthy human placenta umbilical cord[4,5] and meconium[6] may falsify the sterility argument of uterine cavity, however the pathogenic influence of certain bacteria including tuberculosis already reported earlier, including our laboratories[7]. Recent studies documented a specific microbial architecture in amniotic fluid (AF) that characterised by low richness and low diversity and postulates that the microbial transfer occurs at the foeto-maternal interface which further alters after initiation of feeding[8]. However, a recent report contradicts the argument about distinct microbial architecture and proposed that term infant may not normally exposed to bacterial or viral populations due to its less biomass though the same is also countered[9].

Human Microbial Diversity argued as an ancient symbiosis, maintaining homeostasis, boosting host-immunity and growth but the initiation of microbial colonisation in the womb or after the birth seems unresolved and contradictory till date due to its sparse data.

Materials and Methods:

In present study we tried to map the AF microbiome from a group of C-section delivery to strengthen the considerable knowledge gap about the microbial colonisation of humans. AF was collected from 6 pregnant women who gave term birth attending from antenatal clinics of NE India, upon written informed consent in accordance with the Institutional-Ethics-Board. This study only included individuals who had a normal pregnancy outcome; all babies were born in C-section and were of normal weight. AF samples were obtained during sterile caesarean section and transferred immediately in ice and DNA was extracted using the Qiagen-stool-DNA-Kit within 1 hour of collection. Amplicons were generated through 16s universal primer for variable region 3 and 4 and sequenced on Illumina-HiSeq2000 and analysed through QIIME (Version 1.9.0)[10]. Statistical analysis was performed in R. Details of methodology in Supplemental file (S1a-c).

Results:

Our present study reveals that AF harbours 122.8±11.82 (SD) bacteria specific OTUs among the 6 samples that range from 111 to 141. Reads generated for the samples range from 1330294 to 894630 with the mean of 10527.69±51358(SD) for each pair. A total of 846406 sequence reads identified as bacteria which cover 15 phyla across the samples with the mean of 141067.7. The data reveal that phyla proteobacteria (minimum 34.4% to maximum 91.05 with the mean of 53.2%) and firmicutes (minimum 8.2% to maximum 61.7% with the mean of 37.1%) present in most abundant manner followed bacteroidetes (6.1%) and actinobacteria (3.02%) among the samples (Fig 1). The proportion of phyla like TM7, verrucomicrobia present in <1% in all samples and the phyla armatimonadetes, cyanobacteria, fibrobacteres, fusobacteria, lentisphaerae, planctomycetes, synergistetes and thermi present in few samples with the abundance of <0.001%. To compare the phylum distributional diversity among the AF that are presented in Fig 1. The BKDI index among the six AF, ranges from 0.38 to 0.96. A total of 51 genus specific OTUs are homogenous across the all six AF that covers 89.66% (758332 OTU reads with the mean of 126388.7+16398.6 for each samples) of total 846406 sequence reads that assigned for bacterial sequence among all six samples, may exhibit as core. Among the 51 core

OTUs for six AF, 36 genus identified as core genus that covers 553679 sequence reads (65.33% of total reads assigned for bacteria). Within the core OTUs, the genus

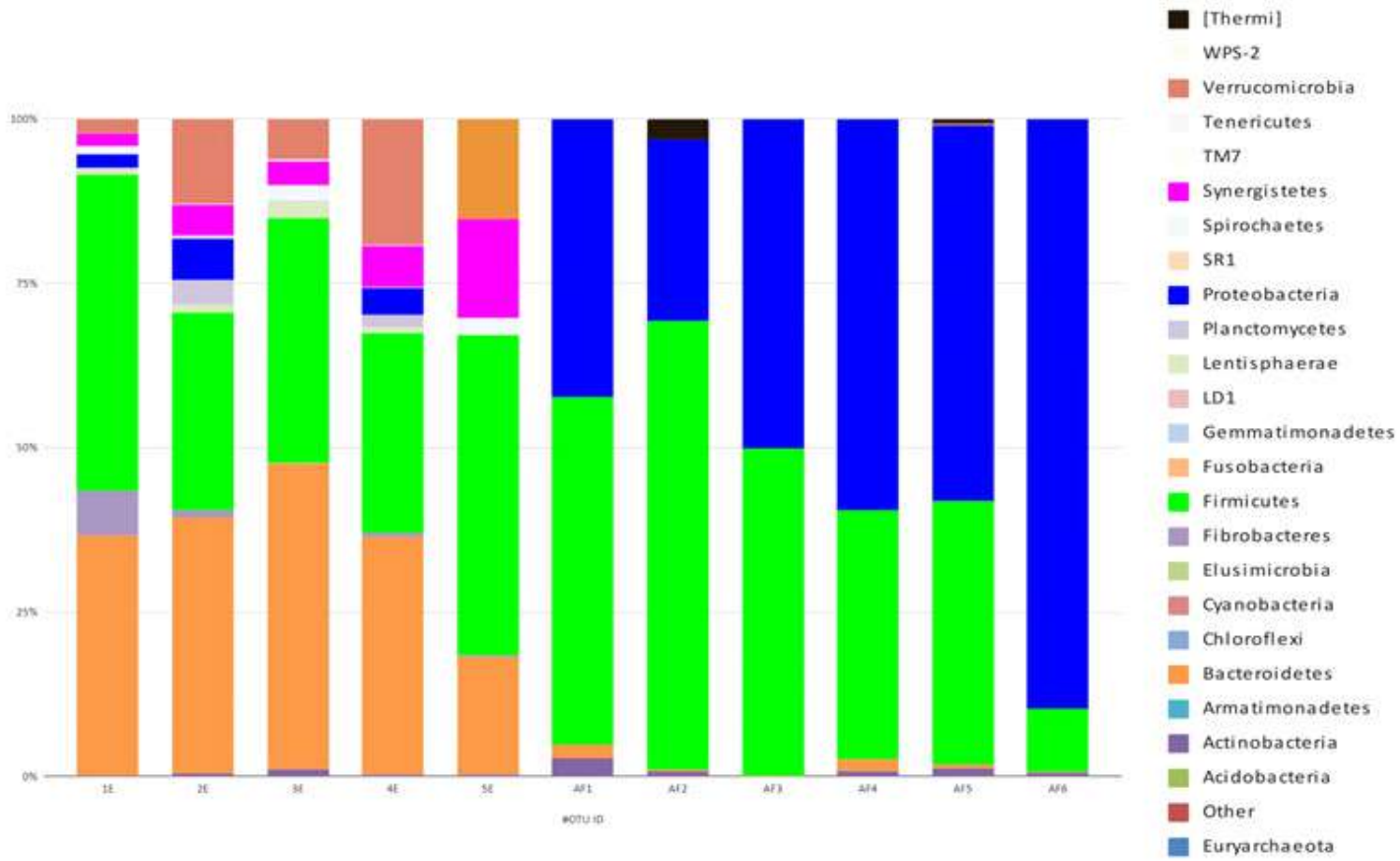

Fig 1 – Distribution of Phyla

staphylococcus (maximum: 77.6% to minimum: 0.2%), aerococcus (maximum:17.2% to minimum: 0.09%), delftia (maximum: 44.6% to minimum: 4.4%), bradyrhizobium (maximum: 29.3% to minimum: 8.2%), azorhizobium (maximum: 6.7% to minimum: 1.5%) and ralstonia (maximum: 11.6% to minimum:1.2%) and lactobacillus (maximum: 2.3% to minimum:0.02%) are the predominant present in abundant manner where prevotella, pseudomonas and akkermansia coexist as core with <1% among the all AF (Fig 2).

In the present study we observed that 111-141 bacterial genus may be present in AF who given C-section derived term live birth without any complication. About 36 genus were identified as core genus in AF microbial ecosystem. Convention belief regarding womb as sterile in nature seems to be falsified as recent next generation sequencing revealed the presence of bacterial biomass in utero. Though the studies postulate that the bacterial biomass present in plasma, uterus and AF but the dogma about sterile nature of foetus still remains a debatable issue due to lack of the comprehensive available data. In present study, we documented that about 36 genus identified as core genus in AF microbial ecosystem in seven AF where staphylococcus (77.6%-0.2%), aerococcus(17.2%-0.09%), delftia (44.6%-4.4%), bradyrhizobium (29.3%-8.2%), azorhizobium (6.7%-1.5%) and ralstonia (11.6%-1.2%) are the predominant (Fig 2). It is postulated that maternal health parameters like short chain fatty acid synthesis and inflammation may have potential impact on AF microbiome. Lim-

ited number of case report also coined increased proportion of certain bacteria like *Snethia sanguinegens* and *Fusobacterium nucleatum* may be attributed for preterm delivery however we did not find the same in any subjects in present study, those who given term birth which may postulate that inflammation associated to chorioamnionitis may potentially contribute to shaping of AF microbial ecosystem.

Discussion:

The observation about more than 30% shared species between AF and meconium samples which accounted for than 90% of total generated reads may signify microbial transmission of maternal-foetal during gestation may have potent impact on womb immune system and prebirth foetal microbial colonisation in the gut which may influence postnatal bacterial colonisation in the neonatal gut. Presence of bacterial commensals like lactobacillus (2.3%-0.02%), ralstonia (11.6%) and akkermamsia (0.03%-0.01%) in AF may be crucial for prenatal neurodevelopment of babies during gestation. Presence of facultative pathogen like prevotella and pseudomonas in very limited abundance seems crucial to initiation of immune activation or sensitisation to inflammatory immune modulators that are

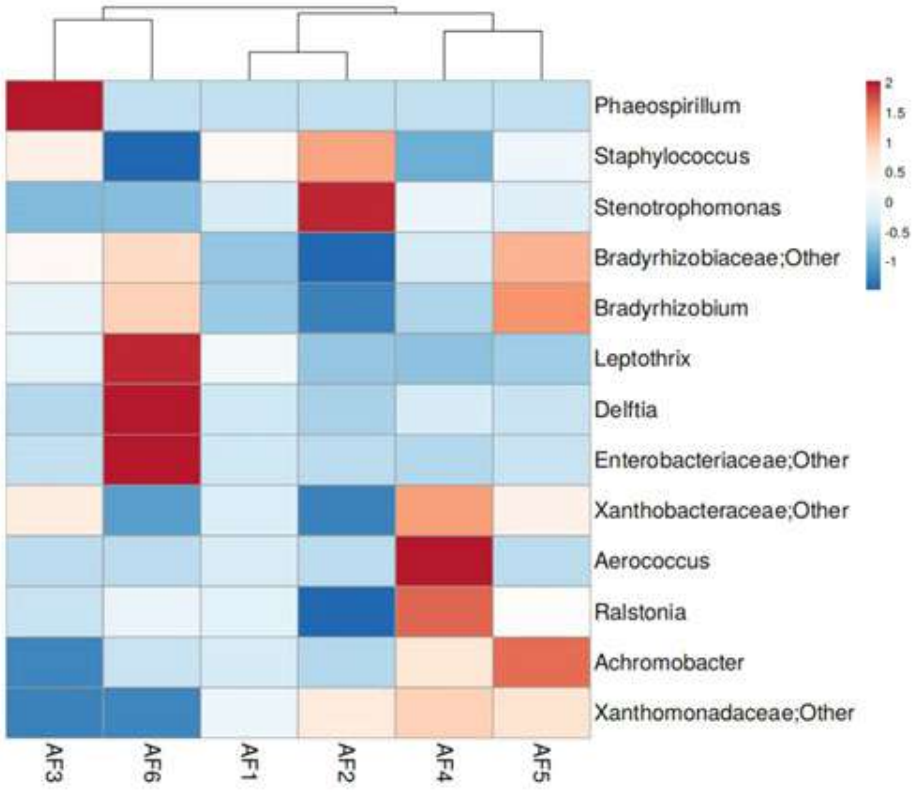

Fig 2 – Heatmap of Key Genus

tulate that there is a striking difference of microbial architecture between term and preterm delivary[9-12]. Pregnancy associated complication chorioamnionitis also associated with differential bacterial population with the proportional difference of *Ureaplasma parvum*, *Streptococcus agalactiae*, *Gardnerella vaginalis*, *Streptococcus anginosus*, *Sneathia sanguinegens*, *Eikenella corrodens* and *Prevotella bivia*. Apart from prevotella that are present in very limited abundance 0.001%-0.006% none of the genus documented in present samples who don't have any pregnancy associated complication may postulate that in-

essential of prenatal development. Further the study is unable to eliminate the contaminant like alcaligens (0.01%-0.002%), limnohabitants (0.09%-0.007%), paucibacter (0.01%-0.002%) and mitsureia (0.4%-0.01%) which seems the limitation of the methods but it comprised the <1% of the total reads and the major of the observed genus share with the human microbiome architecture but differed with the abundance. Hence our present observation may postulate that AF harbours a unique microbiome profile in support of the previous observation. Further studies are also required to strengthen the data as it is comprehensively limited along with the functional consequence to understand prenatal development. Not only in humans the AF microbial exposure is also documented in other mammals like dietary cattle.

Acknowledgements:

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References:

1. Gritz EC, Bhandari V. The human neonatal gut microbiome: a brief review. *Front Pediatr* 2015;**3**:17.
2. Ursell LK, Metcalf JL, Parfrey LW, Knight R. Defining the human microbiome. *Nutr Rev* 2012; **70** (suppl_1):S38-44.
3. Integrative HM. The Integrative Human Microbiome Project: dynamic analysis of microbiome-host omics profiles during periods of human health and disease. *Cell Host Microbe* 2014;**16**(3):276-89.
4. Madan JC, Farzan SF, Hibberd PL, Karagas MR. Normal neonatal microbiome variation in relation to environmental factors, infection and allergy. *Curr Opin Pediatr* 2012;**24**(6):753.
5. Aagaard K, Ma J, Antony KM, Ganu R, Petrosino J, Versalovic J. The placenta harbors a unique microbiome. *Sci Translat Med* 2014;**6**:237.
6. Montoya-Williams D, Lemas DJ, Spiryda L, Patel K, Neu J, Carson TL. The neonatal microbiome and its partial role in mediating the association between birth by cesarean section and adverse pediatric outcomes. *Neonatology* 2018;**114**(2):103-11.
7. Gopalakrishna KP, Hand TW. Influence of maternal milk on the neonatal intestinal microbiome. *Nutrients* 2020;**12**(3):823.
8. Pérez-Cano FJ. What does influence the neonatal microbiome? *Nutrients* 2020;**12**(8):2472.
9. Heijtz RD. Fetal, neonatal, and infant microbiome: Perturbations and subsequent effects on brain development and behavior. *Semin Fetal Neonat Med* 2016; **21**:410-7.
10. Caporaso JG, Kuczynski J, Stombaugh J, Bittinger K, Bushman FD, Costello EK, *et al*. QIIME allows analysis of high-throughput community sequencing data. *Nat Methods* 2010;**7**(5):335-6.
11. Sanidad KZ, Zeng MY. Neonatal gut microbiome and immunity. *Curr Opin Microbiol* 2020 1;**56**:30-7.
12. Arboleya S, Suárez M, Fernández N, Mantecón L, Solís G, Gueimonde M, *et al*. C-section and the neonatal gut microbiome acquisition: consequences for future health. *Ann Nutr Metab* 2018;**73** (3):17-23.

The Fascinating History of Spectacles

Bikas Bhattacharya[1]

Abstract:

Roman tragedian Seneca the Younger (4 BC-65 AD) read books in Rome with glass sphere filled water and this was the first texted observation of magnified vision.The identity of the man who invented reading glasses has long remained a subject of speculation.Opinions once divided between Alessandro di Spina of Pisa and Salvino degli Armati of Florence, Italy.Sometimes it has been attributed to the English scholar Roger Bacon.The first documented pair of eyeglasses is believed to have been created in Italy around 1285. Mostly used by monks, these eyeglasses or spectacles grew in popularity through the Renaissance period. During the 1600s spectacle glass frames with temples looped over the ears were first designed by Spanish craftsman.

Those new types of eyeglasses were brought to China by Spanish and Italian missionaries.Thomas Young was the first to describe and measure astigmatism (1801) using an optometer designed by him.George Biddell Airy is the pioneer person who designed and wore a spherocylindrical correction for his own astigmatic correction. George Biddell Airy also coined the term astigmatism in 1849. Coincidentally, Chauncey E Goodrich, an American scientist also discovered his own astigmatism in the same year (1827). Later glasses were designed to be held in place by ribbon or by exerting pressure on the bridge of the nose, such as with pince-nez.

Key words: Spectacles, eyeglasses, Allesandro di Spina, Roger Bacon, Benjamin Franklin, bifocal glasses, Benjamin Martin.

Introduction:

The wearing of spectacles has now become a common everyday item apart from carrying a cellphone by people around the world. Perception and intellectual quality of life would have been quite different without the spectacles.

The development of glasses as a common treatment for correction of refractive error took centuries, with many brilliant innovators paving the path to the perfect vision you get to enjoy today. We will take a glance into the historical evolution that now allows millions of people to read, drive, perform surgery, day-to-day work and excel in their professional skill.

Who Invented Spectacles?

The exact origin and inventor of spectacles are mostly unknown and a matter of conjecture[1-7]. Whether it was Roger Bacon or Salvino d'Amarti or someone else or

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whether eyeglasses were first used by the Greeks, Romans, Chinese or Egyptians is still unknown to us[1-7]. However, the Romans first discovered the ability to use glass to enhance their ability to see small text, creating small magnifying glasses with spheres. The first documented pair of eyeglasses is believed to have been created in Italy around 1285. However, Marco Polo claimed to have seen many a pair in China in 1275.

Earliest Reference:

"Letters, however small and indistinct, are seen enlarged and more clearly through a globe or glass filled with water". This simple sentence, written by Roman tragedian Seneca the Younger (4 BC-65 AD), is how he read books of Rome and this was the first recorded observation of magnified vision.

Artefacts simulating lenses have been excavated from archeological sites that date back to as early as 1550 BC[1-8]. The Greek author and "father of comedy" Aristophanes wrote about a burning lens in his comedy play "The Clouds" in 423 BC.

Beginning of the Eyeglasses:

The earliest glasses used in spectacles were comparatively crude but were quite popular particularly among the monks, long before the optical system of the eye was explained successively by Johannes Kepler, Thomas Young, Sir George Biddell Airy and Frans Cornelis Donders.

The invention of spectacles points to the late thirteenth century, probably in Florence, Italy. The identity of the man who invented reading glasses has long remained a subject of speculation, with opinions once divided between Alessandro di Spina and Salvino degli Armati. Once attention has been drawn to a inscription on tomb in Florence, Italy. The inscription is "Here lies Salvino, son of Armato degli Armati of Florence, inventor of eyeglasses. May God forgive his sins. AD 1317"[9]. However, several scholars concluded that this inscription was a hoax and deliberate claim of more recent origin[2,10]. Sometimes it has been attributed to the English scholar Roger Bacon.Roger Bacon conducted a number of experiments with mirrors and lenses, and commented in his Opus majus (1268) that lenses properly shaped might have a corrective effect on persons with poor eyesight. Roger Bacon wrote about the ability of convex lenses to magnify, and appears to have used a segment of glass sphere to aid in reading. However, it seems unlikely that he mounted such lenses in a spectacle frame or hold them close to his eye. Another person sometimes connected to the invention of spectacle was an Italian monk named Alessandro dela Spina. A manuscript from Pisa says he was a nice and humble man who made spectacles for himself and his friends.There were conflicting writings as to whether he was the inventor of spectacles or learned from someone else. In a sermon dated February 23,1305,a monk from Pisa, Giordano da Rivalto stated, "It is not yet 20 years since there was discovered the art of making eyeglasses". This would place the invention of spectacles around 1285. However,the first person to make spectacles was most likely an unknown artisan, who tried to keep his knowledge secret to avoid economic competition.Primitive glass-blown lenses made from a type of quartz called beryl were set into wooden, leather or animal horn frames and then held either before the face or perched on the nose. Mostly used by monks, these grew in popularity and the technology improved through the Renaissance.In the 13th century, glassworks in Murano, Italy was the only factory that had the ability to manufacture the soft glass essential to the manufacture of lenses.

Once early spectacles developed, they must have been popularised quite quickly. Spectacles manufacturing industries slowly started appearing by AD1300 in Nuremberg in Germany, Haarlem in the Netherlands and Venice in Italy. The earliest technique to prepare durable paper also developed around the same period followed by the invention of the printing press after a brief period of time. Both of these developments must have stimulated the craving for literacy with consequent demand for spectacles which have increased as well. Early spectacles contained convex lenses and were mostly used for reading purposes.

The first known written description of the use of concave lenses in spectacles appeared in 1458 in a book "De Beryllo" authored by Nicolaus Cusanus, a German philosopher.

Artwork remains the best testament that these glasses existed, as early Renaissance paintings sometimes depicting scholars using handheld frames or perch-style glasses. First portrait to show spectacles is that of Cardinal Hugh of Provence. The portrait fresco was painted by Tommaso da Modena in the Dominican Chapter of the church of St Nicholas in Treviso (Italy), 1352 (Fig 1). His painting depicts the monk reading and writing manuscript wearing glasses perched on his nose.

In 1480 Domenico Ghirlandaio painted St Jerome at a desk with dangled eyeglass (Fig 2). Subsequently, St Jerome became the Patron Saint of the spectacle-makers guild. During the Renaissance period glasses were status symbols of intelligence and prosperity.The glass making technique remained stagnant onwards for several centuries. During the 1600s spectacle glasses first became hands free obviously with the addition of temples in spectacles frames to extend over the ears.

Those first eyeglass frame temples were made by Spanish craftsman. They affixed ribbons of silk or strings to the frame and looped them over the user's ears. The new types of eyeglasses were brought to China by Spanish and Italian missionaries. However, Chinese people modified the loops by attaching small metal weights to the strings instead of making loops.

Early Development:

Thomas Young was the first to describe and measure astigmatism (1801). He used an optometer designed by him to measure his own astigmatism. He had myopia and against the rule astigmatism[9]. Thomas Young usually did not wear any spectacles and was more comfortable with a concave monocle which he would tilt to look through obliquely to correct his astigmatism[10].

George Biddell Airy, an English mathematician and astronomer is the pioneer person who designed and wore a spherocylindrical correction for his own astigmatic correction. He also had myopia and against the rule astigmatism like Thomas Young. Fuller, an optician of Ipswich, England manufactured the spherocylindrical correction glasses for George Biddell Airy , which were meant to be held by hand. George Biddell Airy coined the

Fig 1 – Portrait of Cardinal Hugh of Provence by Tomasso da Modena–First Depiction of Glasses

term astigmatism in 1849 in consultation with his colleague William Whewell in 1849. Coincidentally, an American scientist also discovered his own astigmatism in the same year (1827). Chauncey E Goodrich described his astigmatism and used spherocylindrical lenses made by John McAlister Jr of McAlister family of opticians of Philadelphia. Later glasses were designed to be held in place by ribbon or by exerting pressure on the bridge of the nose, such as with pince-nez.

Modern Development:

Perhaps the most popular of more improved glasses include "Martin's Margins", spectacles with thinner lenses supported by durable frames invented by Benjamin Martin.

He is one of the most famous 18th century eyeglass manufacturers. His glasses were named Martin's Margins. After the "temple" innovation, Benjamin Franklin invented the bifocal lens, which allowed a presbyopic person to use

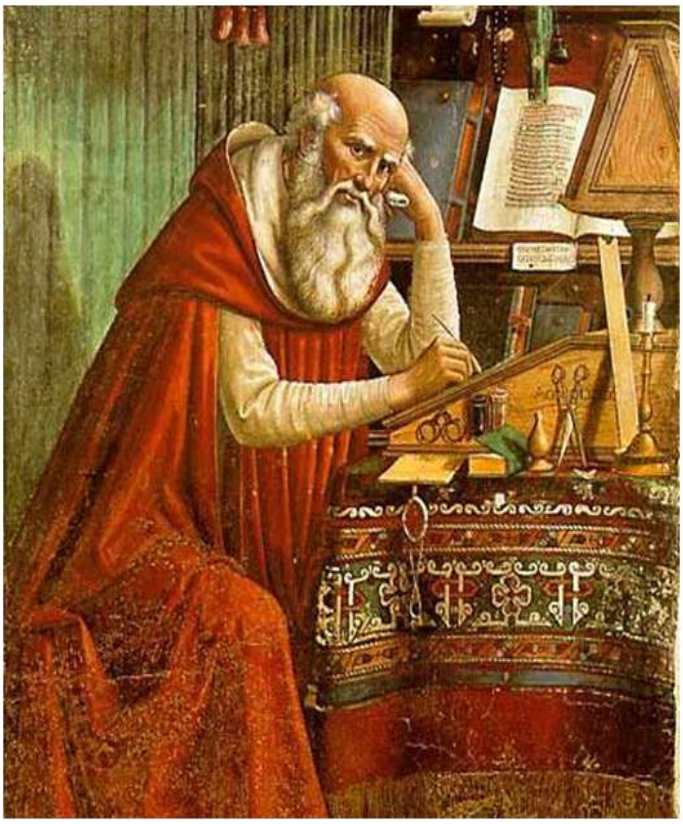

Fig 2 – Portrait of St Jerome at His Desk by Domenico Ghirlandaio

one pair of glasses instead of two. He did this by fixing two lenses together into one frame. Another style that was prominent during this time was "scissor spectacles". These were glasses that could be stored in the pocket and taken out when needed for seeing something important.

Conclusions:

Finally, the 1980s saw the introduction of plastic/ resin lenses. These were more durable, lighter and thinner than their glass predecessors. Modern technology continues to improve glasses with protective coatings that reduce glare and ultraviolet light. Sunglasses were invented in 1929 by Sam Foster. He made it utilising the polarising filter.

Roman tragedian Seneca the Younger (4 BC-65 AD), private tutor of Emperor Nero, read books in Rome with globes filled with water. Though this was the first recorded observation of magnified vision, the history of eyeglasses improved consistently through the ages. The first documented pair of eyeglasses is believed to have been created in Italy around 1285. So, the spectacles we wear are the result of centuries of innovative ideas and quest for knowledge and technology.

References:

1. Hofstetter HW. Optometry: Professional, Economic, and Legal Aspects. St Louis: Mosby,1948:17-35.
2. Rosen E. The invention of spectacles. *J Hist Med Allied Sci* 1956;**11**:13-46,183-218.
3. Hirsch MJ, Wick RE. The Optometric Profession. Philadelphia: Chilton,1968:75-88.
4. Duke-Elder S, Abrams D. Ophthalmic optics and refraction. In: Duke-Elder S, editor. System of Ophthalmology, 5. St Louis: Mosby,1970:609-24.
5. Albert DM. Ocular refraction and the development of spectacles. In: Albert DM, Edwards DD, editors. The History of Ophthalmology. Cambridge, MA: Blackwell Science,1996:107-23.
6. Rosenthal JW. Spectacles and Other Vision Aids: A History and Guide to Collecting. San Francisco: Norman Publishing, 1996:35-49,489-95.
7. Park D. The Fire within the Eye: A Historical Essay on the Nature and Meaning of Light. Princeton, NJ: Princeton University Press, 1997:121-5.
8. Enoch JM. Early lens use: lenses found in context with their original objects. *Optom Vis Sci*1996;**73**:707-15.
9. Fernando Leopoldo del Migliore, Firenze città noblissima illustrata [Florence, Most Noble City, illustrated] Florence: Stella, 1684:431.
10. Isidoro del Lungo (1920) "Le vicende d'un'impostura erudita (Salvino degli Armati)" (The story of a scholarly fraud (Salvino degli Armati)), Archivio Storico Italiano, LXXVIII (vol I) 5-53.

Limb Salvage Surgery in Soft Tissue Sarcoma Involving Sciatic Nerve and Femoral Vessels in Thigh – A Case Report from Eastern India

Ayush Keshav Singhal[1], Manas Mukul Mandal[1], Anindya Ray[2], Diptendra Kr Sarkar[3]

Abstract:

Soft tissue sarcomas are a rare and heterogeneous group of mesenchymal tumours and are represented by only 1% of malignancy in adult population. Involvement of nerves and vessels is challenging issues and reasonable oncological outcomes have been achieved in past by limb salvage surgery. Here a case in a 33-year-old male is reported who presented with a huge swelling on the posterolateral aspect of right thigh. MRI of thigh revealed space occupying lesion at posteromedial aspect of mid and distal part of right thigh. Core biopsy revealed spindle cell neoplasm. The mass was successfully resected sparing the nerve and vascular components of the thigh. Limb salvage surgery is the new horizon forward. Amputation was avoided and all efforts to limb salvage done so that it doesn't impact the oncological and functional outcomes.

Key words: Soft tissue sarcoma, limb salvage, spindle cell neoplasm.

Introduction:

Soft tissue sarcomas (STS) are a rare and heterogeneous group of mesenchymal tumours and represent only 1% of malignancy in adult population[1]. The most common site affected is the lower extremity accounting approximately 28% of all STS[2].

Surgery plays an essential role in management of STS. Achieving negative microscopic margin is important. Involvement of nerves and vessels is challenging issues and reasonable oncological outcomes have been achieved in past by limb salvage surgery[3].

Here we present a case of a large thigh STS, involving the sciatic nerve and blood vessel. Successful resection of the mass was done sparing the nerve and vascular reconstruction done.

Case Report:

A 33-year-old male patient who was previously healthy complained of an increased enlargement in the posteromedial aspect of the right mid-thigh four years ago. The examination revealed a 25x10x18cm high consistency mass, immobile on the posteromedial aspect of the entire right thigh with restriction of knee joint, no distal neurovascular deficit. Core biopsy revealed spindle cell neoplasm. Mag-

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netic resonance imaging revealed space occupying lesion of mesenchymal origin at posterior medial aspect of mid and distal part of thigh with no involvement of the blood vessels (Fig 1).

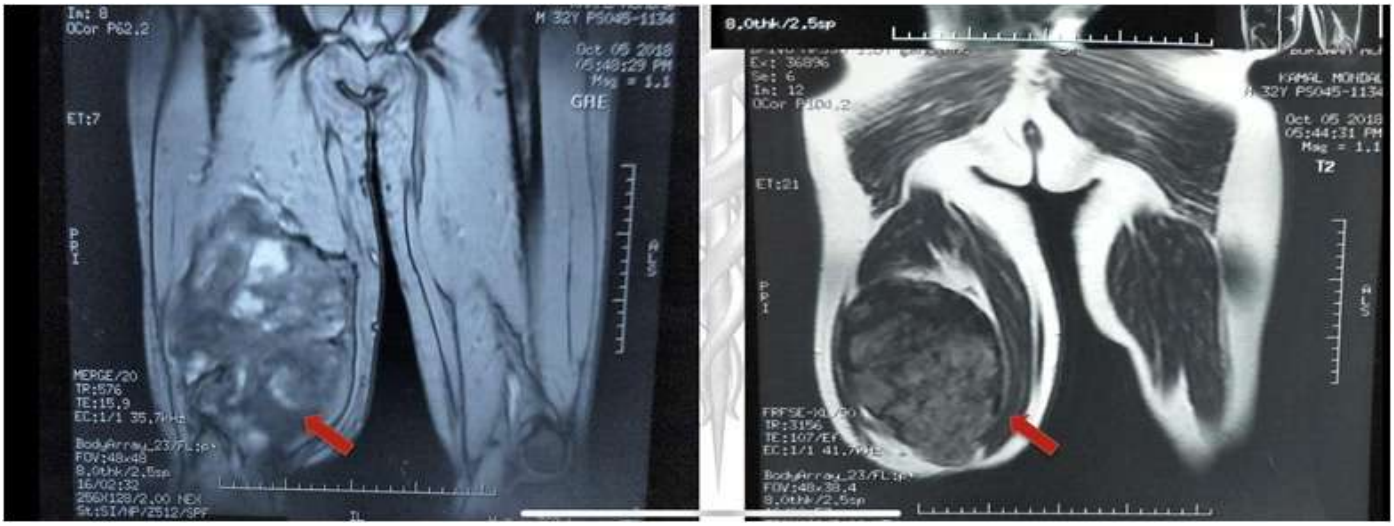

Fig 1 – MRI Showing Space Occupying Lesion at Mid and Distal Part of Right Thigh

The case was discussed in multidisciplinary meeting and primary surgery was planned. Intra-operatively it was found that sciatic nerve was going through the tumour. Adhesiolysis was done and nerve was separated. Distal portion of tumour was found to be fixed to blood vessels (femoral artery and femoral vein). The tumour was resected with vessels and a primary reconstruction of the femoral artery was done with dacron graft and femoral vein with the saphenous vein (Fig 2).

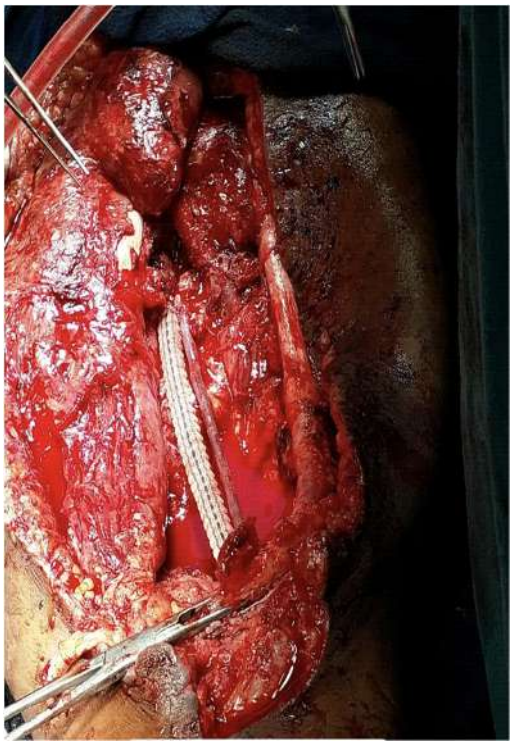

Fig 2 – Showing Vascular Reconstruction Surgery Done with Dacron and Saphenous Vein Grafting

Postoperatively the patient was kept on acitrom, aspirin and clopidogrel. The recovery was uneventful and final biopsy report was suggestive of histopathological features of proliferation of atypical cells in steriform pattern. Cells had scanty cytoplasm, elogated nuclei, granular chromatin and some cells showed prominent nucleoli. Some cells showed abnormal mitosis –fibrosarcoma subtype of spindle cell sarcoma (Fig 3, H&E, X40). Resection margins were free.

Discussion:

Spindle cell carcinoma is a rare epithelial tumour, which is a type of low-grade malignant tumour and characterised by frequent local recurrence and uncommon distant metastases.

Very few cases have been reported of spindle cell neoplasm. Podetta *et al*[4] reported two cases of low-grade

fibromatosis-like spindle cell metaplastic carcinoma of the breast. Sun *et al*[5] reported cases of mucinous tubular and spindle cell carcinoma of the kidney. Velazquez *et al*[6] reported 6 cases of desmoplastic/spindle cell squamous cell carcinoma of the skin.

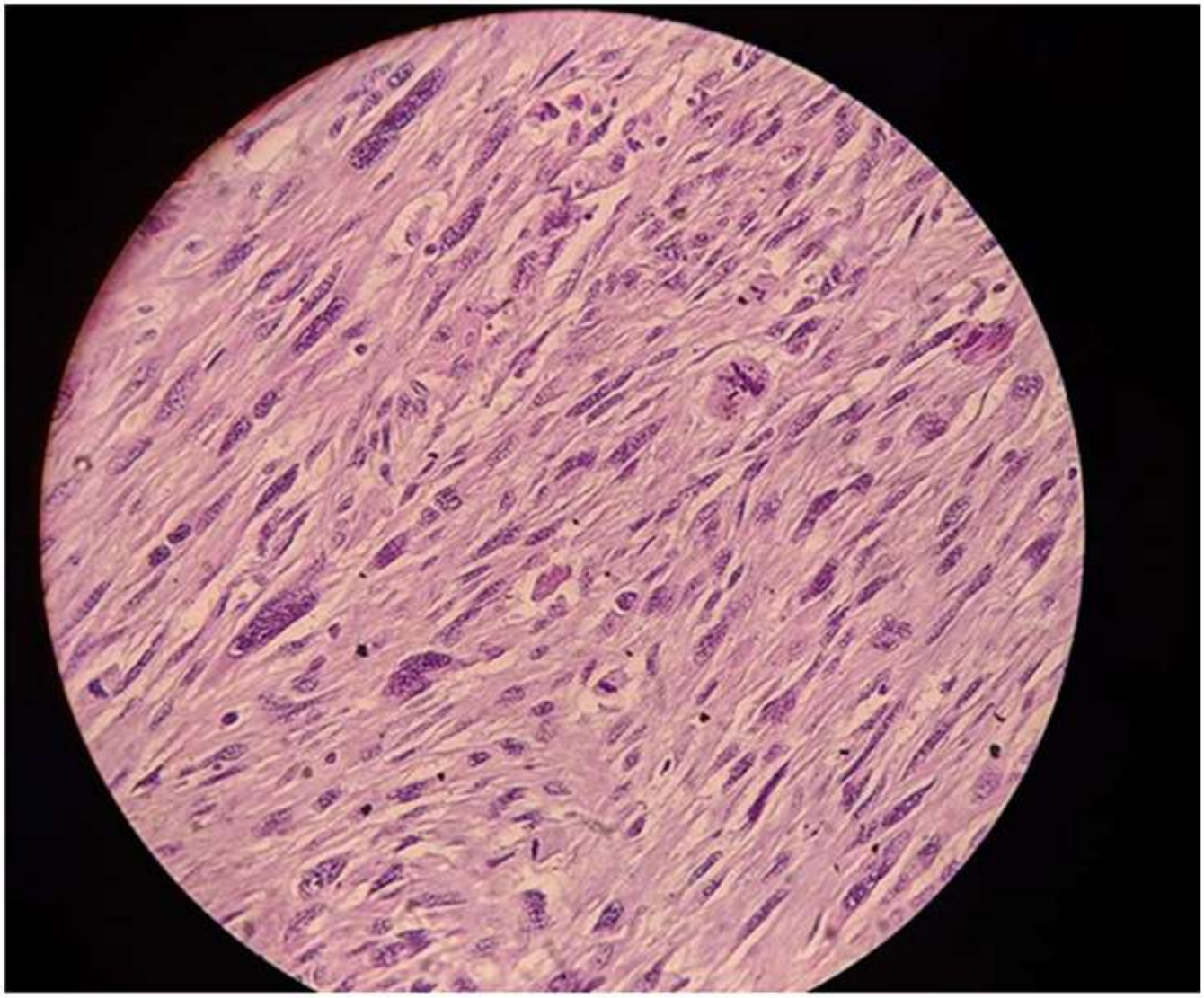

Fig 3 – Histopathological Image of Fibrosarcoma, Subtype of Spindle Cell Sarcoma

Due to rarity of case and lack of data there are no consensus and specific guidelines in such type of cases which pose a challenge with nerve and blood vessel involvement .

Emori *et al*[7] in their study have showed en-bloc resection of major critical structures along with tumour and vascular reconstruction using synthetic grafts is a feasible option in limb salvage surgery for inguinal STS.

In this case it was a challenge to preserve the limb as the tumour was involving the nerve and vessel and we were able to save the limb by preserving the nerve and reconstructing the vessels.

Conclusions:

STS can reach to large sizes which makes complete surgical resection with free surgical borders a real challenge. Limb salvage surgery is the new horizon forward.

Amputation must be avoided and all efforts to limb salvage shall be done as it doesn't impact the oncological and functional outcomes.

References :

1. Siegel R, Ma J, Zou Z, Jemal A. Cancer statistics. *CA Cancer J Clin* 2014; **64**(1):9-29.
2. Brennan MF, Antonescu CR, Moraco N, Singer S. Lessons learned from the study of 10,000 patients with soft tissue sarcoma. *Ann Surg* 2014; **260**(3):416-24.
3. Nambisan RN, Karakousis CP. Vascular reconstruction for limb salvage in soft tissue sarcomas. *Surgery* 1987; **101**(6):668-77.
4. Podetta M, D'Ambrosio G, Ferrari A, Sgarella A, Dal Bello B, Fossati GS, *et al*. Low-grade fibromatosis-like spindle cell metaplastic carcinoma: a basal-like tumor with a favorable clinical outcome: report of two cases. *Tumori* 2009; **95**: 264-7.
5. Sun N, Fu Y, Wang Y, Tian T, An W, Yuan T. Mucinous tubular and spindle cell carcinoma of the kidney: a case report and review of the literature. *Oncl Lett* 2014; **7**: 811-4.
6. Velazquez EF, Werchniack AE, Granter SR. Desmoplastic/spindle cell squamous cell carcinoma of the skin. A diagnostically challenging tumor mimicking a scar: clinicopathologic and immunohistochemical study of 6 cases. *Am J Dermatopathol* 2010; **32**: 333-9.
7. Emori M, Hamada K, Omori S, Joyama S, Tomita Y, Hashimoto N, *et al*. Musculoskeletal Oncology Service. Osaka: Osaka Medical Center for Cancer and Cardiovascular Diseases. emrmkt@ yahoo.co.jp

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