

Incidence of Transfusion Transmitted Infections at Tezpur Medical College & Hospital, Tezpur, Assam, India. (A Retrospective Study & Personal Experience)

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Abstract: Any pathogen may transfer from one unchecked units of blood from a donor to a recipient. Transfusion transmitted infection is one the greatest challenge in blood banking practices today. In our blood bank, we are carefully follow the guide lines framed by State AIDS Control Organization and Assam State Blood Transfusion Council guide lines which further, followed by National AIDS Control Org. and National Blood Transfusion Council, New Delhi. **Material and Method:** The study was carried out in Tezpur Medical College & Hospital Tezpur, Assam for a period of one year from Jan 2016 to 2020 as per norms. All clinical tests were carried out like Malaria, Syphilis, Hepatitis B, and Hepatitis C, HIV I and II and other mandatory tests as per guide lines. **Observation and Results:** The results were recorded in different departmental TTI register as per NACO norms. We could record a good number TTI annually as HBsAg 114(0.55%), HIV 21(0.10%), HCV 34 (0.16%), and VDRL 43 (0.21%) and MP (Malaria) 26 (0.12) over a period of five year. Total collection was 20617 including both OPD and In house collection. **Discussion:** Transfusion transmitted infection is very common in tropical country like India, especially state like Assam. Pathogen may skip through whole blood, blood by products, plasma, plasma derivatives and different phages of experiment while doing collection, un checked / poor testing facility and result into unexpected outcome.

Keywords: Transfusion transmitted infection, serological blood tests; State AIDS control Org. Assam State Blood Transfusion Council

1. Introduction

The mystic principle of life called “Blood” is an idol of trust, the result of continuous rubbing of purified knowledge at what we are on today.

Modern blood transfusion is a part and parcel of medium and high grade hospital where good number of indoor admission is done. It is a very high tech scientific device which can be applied to save by one human to other human life.

History says the great Leviticus17:11, “**the life of the flesh is in the blood,**” and the Chinese Neiching (ca.1000BC) claims the blood contains the soul. Pre-Columbian North American Indians bled their bodies “**of its greatest power**” as self-punishment.

Egyptians took blood bath s as a recuperative measure, and Romans drank the blood of fallen gladiators in an effort to cure epilepsy. The Romans also practiced a ceremony called taurobolium—a blood bath for spiritual restoration. A citizen seeking spiritual rebirth descended into a pit, or *fossasanguinis*. Above him on a platform, a priest sacrificed a bull, and the animal’s blood cascaded down in a shower upon the beneficiary.

Then, in a powerful visual image, the subject emerged up from the other end of the pit, covered with blood and reborn.

An apocryphal story still echo, Pope Innocent VIII had received blood of three young boys, in 1492 while he was deathbed. The story flash out, a physician by that time tried

donate again from these three young boys who aged around 10 yrs of age, but succumbed to death.

Many untold stories of ancient Greek believed that blood formed in the heart and passed through the veins to the rest of the body.

Galen (131–201AD) finally proved that arteries contain blood, communication with the venous system was not suspected. Blood, formed in the liver, merely passed through the blood vessels and heart on its way to the periphery. These teachings remained in place for 1400 years until they were swept away in1628by Harvey’s discovery of the circulation.

Studies by Emil Ponfick and by Leonard Landois finally put an end to this practice. Ponfick, in carefully controlled studies, confirmed the lethality of heterologous transfusion and identified the resulting hemoglobinuria along with its donor erythrocyte source. Landois documented the poor results of animal-to-human transfusion and demonstrated the lysis of sheep erythrocytes by human serum in vitro.

Good number of physicians were confused, turned down with great frustration with blood as a transfusion product and had to compromise to look even more bizarre innovations.

Many types of transfusion practices were done from1873 to1880, cow, goat, and even human milk were transfused as a blood substitute.

Transfusion-transmitted infections (TTIs) are infections are very common in a developing setup where migration of a

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pathogen into a recipient through improper blood tests/transfusion. Huge variety of organisms, including bacteria, viruses, and parasites can be transmitted through improper handling of blood transfusions. That may lack proper testing facility, in-appropriate lab services, lack trained hands or poor economic condition or out dated reagents.

Out of the bacterias, gram +ve bacteria normally found on the skin, such as *Staphylococcus epidermidis* or *Staphylococcus aureus*, are the most common bacterial contaminants of blood products.

And other gram-ve bacteria are part and parcel of normal flora of the gastrointestinal tract (intestines). So the type of transmission is thought to occur when blood is collected from donors who have bacteria in the bloodstream but without symptoms. Some examples include *Acinetobacter*, *Klebsiella*, and *Escherichia coli* (*E. coli*).

Malaria is a serious and sometimes fatal disease caused by a parasite that commonly infects a specific group of anopheles mosquito which feeds on humans. Person affected get malaria are typically very sick with high fever with chills & rigor, and sometimes complicated even cerebral type.

Another common disease called anaplasmosis is a tick-borne disease caused by the bacterium *Anaplasma phagocytophilum*. Which has a chance transmit to humans by tick bites, primarily from the black-legged tick and the western black-legged tick, and can be transmitted via blood transfusion.

Many viruses that are mostly blood-borne can be transmitted by blood transfusion.

Most of time the donors history is important about their social behavior and health history to help to minimize the risk of transfusion-transmitted diseases.

Viruses like Hepatitis A Virus, Hepatitis B Virus, Hepatitis C Virus, Dengue Fever, Human Immunodeficiency Virus (HIV), Human T-Cell Lymphotropic Virus (HTLV), West Nile Virus, Zika Virus, Prion Diseases, or transmissible spongiform encephalopathies (TSEs, like Variant Creutzfeldt-Jakob Disease (vCJD) are some commonly encountered in laboratory practices a crossed the globe.

2. Material and Method

The study is a retrospective and carried out in the Government Blood Bank at Tezpur Medical College and Hospital, Tezpur from Jan 2016 to Dec 2020 starting from Jan-Dec in calendar year.

Different mandatory blood tests, number of blood units collected, methodology and guideline framed by NACO and NBTC were followed. The laboratory is following the rules and regulations framed by Assam State Blood transfusion Council (under NBTC) and State AIDS Control Organization which is directly under the Directorate of Medical Education, under Department of Health and Family Welfare Government of Assam.

As per norms we encouraged the voluntary blood donation with the help of educational Institutes (Including our Medical College and Para Medics), commercial establishments, Industrial Organizations, Social, Cultural and Voluntary Organization, Youth Forums, Gym Clubs, Political Parties, Religious Organizations, Trade Unions, Insurance employee, Bank organization, Tea garden workers association, different ethnic groups and self-help groups etc. within city as well as remote parts of the entire districts.

3. Observations and Results

The results thus occur was noted.

Year	Voluntary donors	%	Replacement Donors	%	Total
2016	205	5.50	3517	94.49	3722
2017	358	8.57	3820	91.43	4178
2018	494	11.96	3638	88.04	4132
2019	411	9.34	3988	90.65	4399
2020	437	10.43	3749	89.56	4186
Total					20, 617

Year	HBsAg		HIV		HCV		VDRL		MP(Malaria)	
	VD	RD	VD	RD	VD	RD	VD	RD	VD	RD
2016	0	21	0	4	0	0	0	8	0	12
2017	0	30	0	6	0	11	0	8	0	4
2018	0	18	0	6	0	6	0	3	0	4
2019	0	17	0	1	0	8	0	8	0	2
2020	0	28	0	4	0	9	0	16	0	4

The results of HIV, HBV, HCV, and syphilis tests were recorded as NACO norms. The screening tests were performed by only Government supplied with that was available enzyme-linked immunosorbent assay kits.

Hepatitis B surface antigen (HBsAg) was checked with Hepalisa ELISA kits (J.Mitra); HCV was checked with ERBALISA, Gen (V2), ERBA and HIV-Ab was tested with ERBALISA, Gen3, VDRL tests were carried out with Athenese-Dx, Card tests and Mp for Malaria parasite was done MalCard (J.Mitra) rapid kits.

All repeatedly reactive results were confirmed by ELISA and then send to mandatory tests to be confirmed by State Level screening test centre at Gauhati Medical College as per guide lines.

A total of 20617 blood donations were performed from Jan 2016 to Dec 2020 at the Tezpur Medical College Hospital blood bank lab.

Among the 20617 blood donors, 114 (0.55%) and 34 (0.16%) donors were positive for HBsAg and HCV, respectively. HBsAg had higher prevalence compared to HCV infection in the entire study population.

There were donors 21 (0.10%) had positive for HIV I and II and sent to State Level Centre for further investigation and management.

The blood donors were positive for syphilis/VDRL by rapid card test was 43(0.21%) out of total 20617 in five years study period.

In addition, parasitic infection like malaria was found to be 26 (0.12%) out total 20617 in the whole study period.

Comparison of hepatitis B surface antigen was prevalence first-time donors especially most of the donors who came to donate blood in the blood bank. Most of them were self motivated and few were claimed to be family donor who were not aware of the disease.

4. Discussion

Blood, plasma and its components/derivatives are among the most important causes of TTI transmission. The possibility of TTI transmission in the transfusion of every blood unit was carefully done as if it is positive.

In our study, the relatively high rate for transmission of blood-borne diseases was very less as because some of these infections are although said to be severe, life-endangering ones that are incurable or have a difficult treatment process. Thus, TTIs are a significant challenge for blood transfusion services in the blood bank.

High-risk groups and their behaviors, along with the socioeconomic status of people can affect the risk of TTIs in any community. In recent years vaccination against HBV significantly decreased the rate of TTIs in this locality. But recently emerging the "Occult" blood infection is also another challenge to the blood bank.

The incidence of HBV, HCV, and HIV is also higher in low-income group of the society than in middle- and high-income group and has seen in different literature. These data show that there is a direct correlation between the economic condition of people and TTI incidence.

The state with higher income can more easily provide preventive and vaccination programs for their people of their own than states with lower income.

Education is another important factor that can significantly decrease the rate of TTIs among blood donors, mostly by reducing risk behaviors and culture.

Donor selection is an important step in blood safety and different studies have revealed that suitable and appropriate donor selection can significantly improve blood safety. It was shown that blood components of repeated and regular blood donors have a lower risk of TTI transmission than those of first-time donors.

On the other hand, it has been shown that first-time donors are the most common donors in blood transfusion centers. These two issues highlight the importance of the donor selection process in blood transfusion centers, which can significantly improve the safety of blood and blood components. In our study, about one-third of the donors were first-time donors. Similar results were observed in several other studies in Iran and other countries

TTIs was observed quite high among first-time donors with positive history of exposure to different habits and sometimes unknowingly exposed to high risk behaviors.

Many of them were innocent novice young donors who just fulfilled the criteria of donation. The higher prevalence of TTIs among the first-time donors and the confidential counseling were first-time donors are in agreement with other studies conducted many other parts of the world.

In our study, the prevalence of HBsAg and HCV was 0.55% and 0.16% among blood donors, respectively. This rate of infection in the Tezpur Medical College is lower than those of other studies as available in the literature.

It seems that a higher rate of TTIs among first-time donors is a relatively significant challenge for blood transfusion centers.

5. Conclusion

As the high rate of TTIs is very common phenomena among the both OPD donors as well as in house, this is very important to implement some preventive measure like donor deferrals, cancel among the type of blood donors to reduce the overall incidence of TTIs among blood recipients as per norms. Deferrals were notified for second visit or appropriate time as per guide line for next donation if found to be fit.

Some donors who are deferred for long time or permanently were recorded, in deferral register, including their original, address and cell phone numbers for future references.

Following the norms of National AIDS control organization and guide lines provided by National/Assam State Blood Transfusion council, the mandatory tests protocol were done by all available SOP of serological test procedure and recorded in the specific registers. TTI and other serological registered was checked routinely by MO of the blood bank, followed by quarterly checked by Assistant/ Associate Professors. The overall performance was kept ready and to be inspected by MCI now NMC assessors as and when necessary, as well as inspector from State AIDS control authority or Assam State Blood Transfusion Council Members. (ASBTC)

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