Original Article

Suitability of Postmortem Blood for Blood Grouping as Regard to Time since Death in Medico Legal Autopsies in Jamnagar Region

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ABSTRACT

Background: In view utility of various body fluid and their uses in PME, we thought that can we use postmortem blood sample for blood grouping by conventional method which are used in living person? Having this idea in mind we did our project.

Aims: Aim of the present study was to evaluate the suitability of postmortem blood sample for blood grouping by conventional method in relation to time since death.

Materials and Methods: This study was conducted on 500 medico-legal autopsies which were brought to Forensic medicine Department, M. P. Shah Govt. Medical College, Jamnagar during the period of November-2006 to May-2007. Blood was collected from the heart cavity and blood grouping was done by conventional slide method.

Results: Out of 500 cases blood groups for both ABO and Rh system could be detected in 457 cases (91.4%) and in 43 cases (8.6%) could not be detected. Most of the cases were from blood groups B+ve, 157 cases (31.4%), followed by A+ve, 127cases (25.4%). Out of 500 cases blood group was not able to done in 43 cases (8.6%). Out of these 43 cases, maximum cases were belongs to time since death more than 72hrs group that was 19 cases (44.18%). Following that was from group time since death between 6 to 12hrs, 5 cases (11.64%).

Conclusion: Blood grouping for both ABO and Rh system was possible up to 72 hours since death by conventional slide method. Blood groups could not be detected in any case were time since death was more than 72 hours by conventional slide method.

Key words: Blood grouping, Time since death, Post-mortem Blood

INTRODUCTION

Various body fluids after death have been used for various clinical investigations like CSF, estimation in vitreous humor and blood etc. [1]

As regard to blood group estimation most of the forensic literature mentions following two things [1-4].

1. Blood group from ante-mortem blood in clinical cases when blood is withdrawn from living person, and
2. Collection of sample of blood while conduction PME and such sample would be sent to FSL for further examination and detection of blood group.

In view of the above mentioned knowledge pertaining to body fluid and their uses in PME, we thought that can we use postmortem blood sample for blood grouping by conventional method which are used in living person? Having this idea in mind we did our project.

MATERIALS AND METHODS

The blood sample were studied in 500 cases which were brought to Department of Forensic Medicine, M. P. Shah Govt. Medical College, Jamnagar, Gujarat for medico legal postmortem examination (PME). The duration of study was from November-2006 to May-2007.

For this study, blood was collected from heart cavity without anticoagulant and any sterile precautions. However in some cases capillary blood was used as in living. Blood grouping was done by slide method by using standard anti sera (Monoclonal Anti A, Anti B and Anti D). Result was read macroscopically as well as microscopically.

The results of blood grouping were then analyzed in relation to cause of death, time since death, age, sex and other relevant information, filled up in proforma.

RESULTS

Out of the total 500 cases, the male sex outnumbered the females. The total numbers of male were 340cases, (68%) and that of female were 160cases (32%). The maximum number of cases occurred in the age group of 21-30 years, 153 cases (30.6%). The age group of 31-40 years followed it with 98 cases (19.6%). The least affected age group is >80 years, with 5 cases (1%) (Table 1). Victims of Hindu religion were predominately affected in both sexes. The numbers of Hindu males and females were 285cases and 132cases respectively. Total numbers of Hindus were 417 cases (83.4%). Muslim males and females followed them with the figures of 28 cases and 21 cases. Total numbers of Muslims were 49 cases (9.8%). There was no any person of Christian religion found.

Table 1: Distribution of cases according to age group and sex

Age (years)	Male	Female	Total
0-10	9(1.8%)	12 (2.4%)	21 (4.2%)
11-20	33(6.6%)	26(5.2%)	59 (11.8%)
21-30	98(19.6%)	55(11.0%)	153(30.6%)
31-40	71(14.2%)	27(5.4%)	98 (19.6%)
41-50	53(10.6%)	22(4.4%)	75 (15.0%)
51-60	36(7.2%)	05(1.0%)	41 (8.2%)
61-70	26(5.2%)	06(1.2%)	32 (6.4%)
71-80	10(2.0%)	06(1.2%)	16 (3.2%)
>80	4(0.8%)	1(0.2%)	05 (1.0%)
Total	340(68.0%)	160(32.0%)	500 (100%)

In the present study, the maximum number, 338 cases (67.6%) of persons were married. In the unmarried group, the numbers of males were 83 and females were 33. Total numbers of unmarried cases were 116 (23.2%). There was no case found in the group of divorced/widow. Marital status of 46 cases (9.2%) was not known. Uneducated persons predominate with 277 cases (55.4%) over the educated persons with cases177 (35.4%). Educational status of 46cases (9.2%) was not known. Maximum numbers of cases were labourer, 138 cases (27.6%) closely followed by housewives and house dwellers, 121 cases (24.2%). The least affected profession was business with 20 cases (4%). Persons who were retire from their work and those who were not doing any work were included in not applicable cases that were 39 cases (7.8%). In 55 cases (11%), the profession of the victim was not known.

Out of 500 cases blood groups for both ABO and Rh system could be detected in 457 cases (91.4%) and in 43 cases (8.6%) could not be detected (Table 2). Most of the cases were from blood group B+ve, 157 cases (31.4%), followed by A+ve, 127cases (25.4%). Least number of cases found in B⁻ve, 2cases (0.4%) and in 43 cases (8.6%) blood group was not detected for both blood grouping systems.

Out of 500 cases Maximum cases in regards to time since death were from less than 6hrs group, that were 172 cases (34.4%). Followed by 132 cases were (26.4%) from time since death between 6 to 12hrs group. The least affected group is time since death between 48 to 60hrs with only 1case (0.2%). In time since death more than 72 hrs group, there were 19 cases (3.8%) (Table 2).

Table 2: Distribution of cases according to blood group detection and time since death

Time since Death(hrs)	Blood group detected		Blood group not detected		Total
	M	F	M	F	
<6	112 (22.40)	57 (11.40)	0 (0.0)	3 (0.60)	172 (34.40)
>6 - <12	72 (14.40)	55 (11.0)	2 (0.40)	3 (0.60)	132 (26.40)
>12 - <18	98 (19.60)	21 (4.20)	1 (0.20)	3 (0.60)	123 (24.60)
>18 - <24	17 (3.40)	1 (0.20)	1 (0.20)	0 (0.0)	19 (3.80)
>24 - <36	10 (2.00)	0 (0.0)	0 (0.0)	3 (0.60)	13 (2.60)
>36 - <48	4 (0.80)	3 (0.60)	3 (0.60)	1 (0.20)	11 (2.20)
>48 - <60	1 (0.20)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.20)
>60 - <72	3 (0.60)	3 (0.60)	3 (0.60)	1 (0.20)	10 (2.00)
>72	0 (0.0)	0 (0.0)	13 (2.60)	6 (1.20)	19 (3.80)
Total	317 (63.40)	140 (28%)	23 (4.60)	20 (4.0)	500 (100.00)

Out of 500 cases blood grouping could not be done in 43 cases (8.6%). Out of these 43 cases, maximum cases were in the group where the time since death was more than 72hrs, 19 cases (44.18%). Following that was from group where the time since death was less than 12hrs, 5 cases (11.64%). In this study we found 19 cases where time since death was more than 72hrs, blood grouping could not be done in any cases. Out of 43 cases, 13 cases have time since death less than 24 hrs. Out of this 13 cases 10 cases were of burns, one case of drowning and in 2 cases cause of death was kept pending at the time of post-mortem examination (Table-3).

Table 3: Distribution of cases in relation to time since death in which blood grouping was not able to done by conventional method and sex

Time since death	Male	Female	Total	%
<6	0	3(burns)	3	6.97
>6-<12	2(1drowning,1burns)	3(3burns)	5	11.64
>12-<18	1(kept Pending)	3(3burns)	4	9.3
>18-<24	1(kept Pending)	0	1	2.34
>24 -<36	0	3(1Kept pending, 1Drowning, 1Burns)	3	6.97
>36 -<48	3(1Drowning, 1Assult 1Kept pending)	1(1Kept pending)	4	9.3
>48-<60	0	0	0	0
>60-<72	3(3Kept pending)	1(Assault)	4	9.3
>72	13(10 kept pending, 1Assault, 1 Drowning,1 Poisoning)	6(5 Kept pending, 1Poisoning)	19	44.18
Total	23	20	43	100

*Cause of death of cases in which blood group was not detected was mentioned in bracket.

DISCUSSION

It was observed that most of the cases were of male, (68%).The male predominance may be explained by the fact that male by nature indulge in various day to day outdoor activities and other social activities and customs as compared to female. It was observed that most of the cases were between age group 21-30 years (30.6%). This can be explained by the facts that by nature they are more active, violent and arrogant. They are more vulnerable to the fast changing social trend and cultures as they are mentally a bit immature with little experience of life. They are mostly married during this period and so they are exposed to a new married life full of family and social adjustment. They are main breadwinners of the family indulging lavishly in various social activities. In our study victims of Hindu religion were more as compared to other religion in both male and female. This was because Jamnagar region has a predominantly Hindu population.

It was observed that most of the deceased were married in our study. In India, by the age of 21 or above most of person get married and marriage demands a lot of mutual understanding, adjustment and sacrifices. It also involves a lot of family and social responsibilities. It was observed that most of the deceased were illiterate (55.4%), due to the fact that Jamnagar being predominantly rural with small urban area, having a low literacy rate. It was observed that most of the deceased were laborers (27.6%), due to the fact that Jamnagar is growing as industrial city and it attracts many laborers from other places for job and good future.

One study of similar nature by Enticknap [5] was done in London in early 50 era, he got 100% result for blood grouping by both ABO and Rh system. All autopsies were done between 3 and 140 hrs and dead bodies were stored at 7^{o}C. National Blood Transfusion Ser-(vice sera) was used with saline or albumin anti-D as available and the results were read both macroscopically and microscopically. But we found that in our Indian tropical conditions also it was not difficult to do blood grouping on postmortem blood. As our results show postmortem blood remains suitable as late as up to 72 hours since death for detection of blood groups by simple slide method without properly refrigerated body.

When blood sample is sent to Forensic Science Laboratory (FSL) the blood grouping was conducted by absorption elution method. [1, 3, 4,] From the fact of the science, we know that this absorption elution method is time consuming and requires if not many, at least few instruments to get the desired temperatures, that is, 4^{o}C and 56^{o}C, at the same time it also requires preparation of various antisera. In many cases in our experience we found that test for blood group turn out to be inconclusive. Further, FSL conducts the test only for one system of blood groups, which is ABO system.

As against that here we found in our study, with bare minimum infrastructure we could do ABO as well as Rh grouping in about 92% of cases with certainty.

In our study we have found 6 cases of Rh-ve blood groups but a question could be raised whether false negative were responsible for such results? Our answer to this question is in no. Because before stamping them Rh-ve we have taken care of false negatives. These 6 cases fell in three categories as regard to time since death. Their distribution was 3 cases in less than 6 hours group, 1 case in more than 6 hours and less than 12 hours group and 2 cases in more than 12 hours and less than 18 hours group. In less than 6 hours category out of 169 cases in which we could detect blood group in 166 cases we could detect Rh+ve, in more than 6 hours and less than 12 hours category we could detect Rh+ve blood group. In second category in 126 cases out of 127 cases and in more than 12 hours and less than 18 hours category we got Rh+ve in 117 cases out of 119 cases.

That means that conditions, time since death wise as well as technique and technicalities wise were similar in the cases in which we could get the Rh+ve blood group and could not get Rh+ve blood group. Because of these same sets of everything when we did not get Rh+ve blood group we are tempted to say that those cases were that of Rh-ve blood group.

However we could not detect blood groups in 43 cases out of 500 cases. One of the factors which may be established from our study was that if time since death is more than 72 hours the blood sample becomes unsuitable for testing for blood grouping and did not give blood grouping in both the system tested by conventional slide method.

There have been certain numbers of cases in each category as regard to time since death from less than 6 hours to less than 72 hours (Table No 3) in which blood grouping could not be done. As regard to this fact of not getting blood grouping, there may be multiple factors at work. But the factors which were emerging most prominently were related to causes of deaths. In this regard deaths due to burns require special mention.

In cases where time since death was less than 6 hours, when postmortem blood sample was reasonably fresh, if victims died due to burns there were difficulties in conducting blood grouping. It suggests that either pathogenesis or pathophysiology of burns causing some changes in the blood group antigen rendering them undetectable or the treatment offered to such patients affecting the antigenicity. This aspect of our study requires further research. More or less same is true for the cases in which drowning was the cause of death.

CONCLUSION

In the end we can sum up that

- Postmortem blood sample can be used for blood grouping in postmortem room itself.
- Such testing requires minimum infrastructure.
- Such testing can give testing of two blood group systems.
- This system of doing blood grouping is very quick.
- Such type of testing is possible even in country like India which is tropical in nature and where decomposition of dead body is faster.
- Collecting postmortem blood sample and sending it for blood grouping purpose to FSL have multiple disadvantages like technical difficulties, scientific limitations of methods used by FSL, limitations of maintaining continuity of chain of evidence, delay in getting report and so on. By doing blood grouping the way we have done this work, we can overcome almost all of these difficulties.
- We are tempted to suggest that there is no need to collect and send postmortem blood for blood grouping to FSL.

Ours is an institute in small town in a developing country. We feel, if adopted this system of doing blood grouping can be used in most of the towns of most of the developing and underdeveloped countries.

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