

# Profile of Cross Match Positive Reports among Pretransplant Patients at Shahid Dharma Bhakta National Transplant Centre, Nepal

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## Abstract

**Introduction:** The presence of donor-specific antibodies (DSAs) against HLA molecules is a risk factor for humoral rejection after kidney transplantation. The introduction of the complement-dependent cytotoxicity (CDC) test has been a major step forward in excluding high-risk donor-acceptor combinations.

**Objective:** To find out profile of positive Cross match Reports among pretransplant patients.

**Design:** Case series design.

**Settings:** Shahid Dharma Bhakta National Transplant Centre, Bhaktapur.

**Subjects :** Patient who had positive cross match reports from Oct 16, 2021 to May 13, 2022.

**Method:** List of patients prepared who are being prepared for renal transplant Process in duration of six months. There were 46 such pair prepared for transplant and with positive cross match reports. Enumerative sampling technique was used for data collection.

**Results:** The current study depicts that there is significant statistical association between PRAI and DSAII report of pretransplant pair. i.e., (P: 0.002). There is strong statistical association between CDC and PRAII report of pretransplant pair. (p:0.000). There is statistical association between DSA I and COVID 19 infection of pretransplant pair. (p:0.033). There is statistical association between DSA II and COVID infection report of pretransplant pair. (p:0.008).

**Conclusion:** Introduction: The presence of donor-specific antibodies (DSAs) against HLA molecules is a risk factor for humoral rejection after kidney transplantation. The introduction of the complement-dependent cytotoxicity (CDC) test has been a major step forward in excluding high-risk donor-acceptor combinations.

**Keywords:** Crossmatch • Transplant • Positive

## Introduction

Transplantation of solid organs is becoming increasingly successful. What was once an experimental and lifesaving emergency procedure is now rapidly brought transformed into a life enhancing and technologically advanced form of therapy. In any form of transplantation, donor selection is one of the most important and critical parameters which influence long term function of the allograft [1]. Immunogenic profiling of transplant recipients and pre-transplant tissue cross match between potential donor and recipient is mandatory in modern-day renal transplantation. Pre-transplant cross match allows characterization of preformed donor specific antibodies in the recipient, allowing prognostication of the prospective transplant and minimizing potentially catastrophic antibody mediated allograft injury [2]. The CDC was the first commonly used cross match technique adopted in routine practice.

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While evolving in technique to minimize its short comings, the CDC remains an integral component of pre-transplant cross match among most transplants centers worldwide [2].

The presence of donor-specific antibodies (DSAs) against HLA molecules is a risk factor for humoral rejection after kidney transplantation. The introduction of the complement-dependent cytotoxicity (CDC) test has been a major step forward in excluding high-risk donor-acceptor combinations [3].

PRA is a complement-fixating assay to test the ability of recipient's serum to lyse a panel of T-cells from a group of potential donors. For a PRA of 20%–80%, there is 50% chances to be transplanted compared to no sensitized patients while the chance is only 5% for PRA greater than 80% [4].

## Rationale of the Study

Each of our kidney transplant recipient patients are required to undergo a prospective CDC cross match prior to the transplant. This helps to improve the success rate for the kidney transplant and ensure that the donor is a suitable candidate.

Blood from the donor and recipient are mixed. If the recipient's cells attack and kill the donor cells, the cross match is considered positive. This means the recipient has antibodies "against" the donor's cells. If the cross match is negative, the pair is considered compatible.

Although long-term allograft outcomes for positive cross match kidney transplantation following desensitization therapy have been shown to be inferior to compatible transplantation, particularly with increasing strength of the cross match, there is an established survival benefit for positive cross match transplant recipients compared with remaining on the transplant waitlist. However, positive cross match transplantation may confer higher risks of infection and malignancy [5].

The rate of positive cross match reports is increasing among pretransplant patient after third wave of COVID 19.

Among patients prepared for renal transplantation 46 pair who has positive cross match report during this period of six months.

## Objectives

**Primary objective:** To find out profile of positive Cross match Reports among pretransplant Patients.

## Secondary objectives:

- To find out clinical and sociodemographic profile of patients with positive Cross reports among pretransplant Patients
- To find out association between selected variables with positive cross match reports

## Variables

**Dependent variable:** Positive cross match report.

## Independent variable:

- Socio- demographic factors: Age and Sex of donor and recipient, relationship between donor and recipient
- Clinical profile: Blood group of donor and recipient, history of BT (less than 1 year), COVID infection status of recipient

## Operational definition

- Cross match positive:** Positive reports of DSA, CDC and PRA
- DSA (I) :** <1000 : Negative
- DSA(II):** <1000: Positive
- PRA(I):** 0-2%: Negative
- PRA(II):** >2%: Positive
- CDC :** 0-20%: Negative
- CDC:** >20%: Positive
- HLA:** HLA-A, B DRB1: total score 6
- Pretransplant patient:** Patient prepared for renal transplant Process in SDNTC.
- Research design:** Case series design.
- Research setting:** Shahid Dharma Bhakta National Transplant Centre, Bhaktapur.
- Study population:** Patient who had positive cross match reports from Oct 16, 2021 to May 13, 2022.
- Sample size:** 46.

## Eligibility criteria

### Inclusion criteria:

- Those whose Cross match report is positive.
- Those who have willingness to participate in study.

### Exclusion criteria:

- Those who do not meet inclusion criteria.

## Research instrument

Semi structured questionnaires were developing on the basis of an objective which consists of:

- Part I:** Questionnaires related to socio-demographic status.
- Part II:** Questionnaires related to clinical profile and cross match reports.

## Data collection procedure

- List of patients prepared who are being prepared for renal transplant Process in duration of six months.
- There was 46 such pair prepared for transplant and with positive cross match reports.
- Enumerative sampling technique was used for data collection.

## Ethical consideration

- Ethical permission was taken from IRC of SDNTC.
- Formal permission was taken from each pair.
- The data was collected by semi-structured questionnaires and through the lab report of cross match report.

## Data Analysis procedure

- Socio demographic and clinical profile was analyzed using descriptive statistics.
- Chi. Square test was used at 95% Confidence Interval where p value <0.05 be considered statistically significant to determine the association between positive report and selected variables.

## Results and Discussion

The study depicts that more than three fourth of donor are female i.e 83.6% and more than three fourth of recipients are male i. 80.4% (Tables 1-11).

The finding is similar with the study entitled "Gender imbalance among donors in living kidney transplantation: the Norwegian experience" the majority of all living donors was female (57.8%) while 62.7% of the recipients were men [6].

The finding is similar with the study entitled "Gender Disparity in Indian Renal Transplantation" done in India among 592 related cases, 74.2% of donors were female and 25.8% male. In the case of recipients, 76.2% were male and 23.8% female [7]. This study depicts that one third of donor i.e 34.8% were mother and about one fourth of donor were wife i.e 26.1% of recipient.

Mean age of donor is 46.93 years and mean age of recipient is 35.76 years. Only 21.7% of recipient was infected with COVID during preparation of renal transplantation i.e before 6 months of cross match. Majority of patient have negative CDC reports i.e 95.7%. About two third of pair i.e 67.4% had negative DSAI report. About three fourth of pair i.e 73.9% had positive DSA II report. More than half of pair i.e 58.7% had positive PRA II and 27% of pair had positive PRAI report. Current study depicts that there was no statistically significant association between age,sex, blood group of patient with positive cross match reports. There is no statistical association between COVID infection and CDC and PRA report of patient. The current study depicts that there is significant statistical association between PRAI and DSAIL report of pretransplant pair. i.e (P:0.002). There is strong statistical association between CDC and PRAII report of pretransplant pair. (p:0.000). There is statistical association between DSA I and COVID 19 infection of pretransplant pair. (p:0.033). There is statistical association between DSA II and COVID infection report of pretransplant pair. (p:0.008).

**Table 1.** Sociodemographic profile of pre transplant Pair (n=46).

Sociodemographic Profile		Frequency(Percentage)
Sex (Donor)	Male	17.40%
	Female	82.60%
Sex (Recipient)	Male	80.40%
	Female	19.60%
Blood group (Donor)	A	16
	B	14
	AB	1
	O	16
Blood group (Recipient)	A	18
	B	14
	AB	1
	O	13
Relation between donor and recipient	Mother to Children	16
	Wife to Husband	12
	In-laws to children	3
	Children to parents	3
	Sibling	7
	Father to children	4
	Husband to wife	1
Age group of donor	21-30	3
	31-40	11
	41-50	12
	51-60	13
	>60	7
Age group of recipient	21-30	14
	31-40	16
	41-50	9
	51-60	7
	>60	0

**Table 2.** HLA Match among Pre transplant pair (n=46).

HLA Match	Frequency(percentage)
0	5(10.9%)
1	5( 10.9%)
2	1(32.6%)
3	8(17.4%)
4	9(19.6%)
5	3(6.5%)
6	1(2.2%)

**Table 3.** DSA report of Pre transplant Pair (n=46).

Result (DSA)	DSA (I)	DSA(II)
Negative	15(32.6%)	12(26.1%)
Positive	31 (67.4%)	34(73.9%)

**Table 4.** CDC Report of Per-renal Transplant Pair (n=46).

Result (CDC)	Frequency
Negative	44 (95.7%)
Positive	2(4.3%)

**Table 5.** PRA report of Pre transplant Pair.

Results	PRAI	PRAII
Negative	29(63%)	19 (41.3%)
Positive	17(27%)	27 (58.7%)

**Table 6.** Recipient with COVID Positive among pretransplant patient (n=46).

Result (COVID-19)	Frequency
Negative	36 (78.3%)
Positive	10 (21.7%)

**Table 7.** History of BT since 1 year among Recipient (n=46).

History of BT	Frequency
Yes	5(10.6%)
No	41(87.2%)

**Table 8.** Association between PRA I and DSA II reports (n=46).

PRA I	DSA II		P value
	Positive	Negative	
Positive	7	22	0.02
Negative	5	12	

**Table 9.** Association between PRA II and CDC reports (n=46).

PRA II	CDC		P value
	Positive	Negative	
Positive	18	1	0.000
Negative	526	1	

**Table 10.** Association between PRA II and COVID reports (n=46).

DSA I	COVID		P value
	Negative	Positive	
Negative	11	4	0.033
Positive	25	6	

**Table 11.** Association between DSA II and COVID Infection among Recipient (n=46).

¥DSAII	COVID		P value
	Negative	Positive	
Negative	10	2	0.008
Positive	26	8	

## Conclusion

The study depicts that more than three fourth of donor are female i.e 83.6% and more than three fourth of recipients are male i. 80.4%. The current study depicts that there is significant statistical association between PRAI and DSAII report of pretransplant pair. i.e (P:0.002), between CDC and PRAII report of pretransplant pair. (p:0.000), between DSA I and COVID 19 infection of pretransplant pair. (p:0.033) and between DSA II and COVID infection report of pretransplant pair. (p:0.008).

## Implications of the Study

The finding of the study might be helpful in the areas of practice, education, administration and research related to factors associated with positive cross match reports among pretransplant pair.

## Recommendations

- The study can be replicated on a larger sample to generalize the findings.

- Comparative study can be done with cross match positive and negative patient.

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## Limitations

- Several visits had been done on lab for reports.
- Many phone calls were made during data collection to patient party despite busy opd schedule.

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