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输血后HLA及血小板相关抗体的检测及其意义

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摘要 应用标准的微量淋巴细胞毒试验，对反复输血的患者进行了血清中HLA抗体筛选及特异性鉴定，同时检测了血小板相关抗体。结果HLA抗体的检出率为39.14%（119/304例），其中24.37%（29/119例）的抗体具有特异性；血小板相关抗体阳性率为39.83%（47/118例）。HLA抗体的阳性频率随输血次数及供血者人数的增加而增高，差异显著。非溶血性输血反应与HLA抗体相关。输注浓缩粒细胞后HLA抗体的阳性频率最高。本文提出了一些预防及减少输血反应的措施。

关键词 输血 HLA抗体 血小板相关抗体 非溶血性输血反应

白细胞血型抗原与输血反应有密切的联系。早在60年代Payne等[1]发现凡具有发热性输血反应的患者，其血清中白细胞抗体的检出率为67%。而Kevy等[2]则认为发热性输血反应与白细胞抗体之间无任何联系。一般认为，造成非溶血性输血反应（NHTR）的白细胞抗体中大多数为HLA抗体，其次是血小板抗体和粒细胞抗体。为了进一步探索输血所致HLA抗体的产生规律、阳性检出率，及其与NHTR的关系，我们检测了304例受血者血清中HLA抗体及118例受血者血小板相关抗体（PAIgG）的阳性率，分析了这些抗体在临床输血反应中的意义，提出了一些预防输血同种免疫反应的措施。

1 对象与方法

1.1 观察对象及血液来源 1988年2月～1990年8月间304例反复输血的住院患者，其中男性180例，女性124例。年龄10～81岁。304例中血液系统疾病132例，胃肠道出血101例，外科及妇科手术41例，其他疾病30例。患者均接受过1次以上的全血及/或成分输血。每单位全血为200ml，每单位成分血相当于200ml全血中含有的血细胞成分。徐州市红十字中心血站制备的每1单位浓缩白细胞悬液中粒细胞含量≥0.5×10^{9}个，每1单位浓缩血小板悬液中血小板含量≥2.4×10^{10}个。

1.2 观察方法 采集304例受检者输血后7天、14天的血清筛选HLA抗体，凡HLA抗体阳性的标本，进一步鉴定抗体特异性。同时测定118例受血者的PAIgG。并观察、记录输血反应的症状。采集了139例有妊娠史或院外输血史的患者输血前血标本进行HLA抗体检测，作为输血前的对照。

1.3 检测方法

1.3.1 HLA抗体检测 采用标准NIH微量淋

·邮政编码 221002

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巴细胞毒试验。从已知 HLA-A、B 位点特异性的个体中，挑选30例作为筛选用试剂细胞供者，阳性血清再进一步以中国医学科学院输血研究所提供的 HLA 抗体鉴定配组淋巴细胞鉴定其特异性。

1.3.2 PAIgG及PAIgA、PAIgM、PAC3联合检测 采用双抗体夹心固相酶免疫法，试剂盒由南通医学院提供。

1.4 NHTR判定 按文献〔3〕有关规定。输血后4小时内发热并体温较输血前升高1℃以上和/或伴皮疹、寒战、心悸、变态反应等，并能排除溶血性输血反应。

2 结果

2.1 HLA 抗体阳性检出率 304例反复受血的患者血清中 HLA 抗体的阳性率为39.14%（119/304例），其中29例（24.37%）抗体具有特异性，计9例抗-B13，8例抗-A2，4例抗-Bw6，2例抗-B17，2例抗-Bw44，1例抗-Bw51，2例抗-A2+B13，1例抗-Aw24+B13。139 例输血前血清标本均未检出 HLA 抗体。

HLA 抗体阳性检出率随受血次数及供血者人数的增加而增高，结果见表1及表2，差异显著（$x^2=15.50$及$x^2=7.30$，P均<0.05）。

2.2 NHTR发生率 304例患者共受血2850单位（全血2528单位，浓缩红细胞254单位，浓缩白细胞68单位），每人受血2～102单位，平均9.38单位。112例（171例次）患者出现NHTR，NHTR发生率为36.84%（112/304）。合每单位血液成分NHTR的发生率为6.0%（171/2850单位）。

2.3 NHTR的发生率与受血者HLA抗体的相关性 并发NHTR组HLA抗体阳性率56.25%（63/112），未并发NHTR组为29.16%（56/192）两组差异非常显著（$x^2=21.78$，$P<0.005$）。但鉴定出的HLA抗体有无特异性与NHTR的发生率间无显著性差异（$x^2=0.067$，$P>0.05$）。

表1 HLA抗体检出率与受血次数的关系

受血次数	例数	HLA抗体	
		阳性数	阳性率(%)
2～5	232	77	33.19
6～10	52	27	51.92
11～15	18	13	72.22
>30	2	2	100.00
合 计	304	119	39.14

表2 HLA抗体检出率与供血者人数之间的关系

供血者人数	例数	HLA抗体	
		阳性数	阳性率(%)
1人～	178	63	35.39
5人～	86	33	38.37
10人～	32	17	53.13
20人～	8	6	75.00
合 计	304	119	39.14

2.4 输注不同血液成分后受血者血清中HLA抗体检出率及NHTR的发生率见表3。NHTR发生率最高的是输注浓缩白细胞者。

表3 输注不同血液成分HLA抗体及NHTR发生率

血液成分	受血单位	HLA抗体		NHTR	
		阳性数	阳性率(%)	例次	发生率(%)
浓缩白细胞	68	6	8.85	7	10.29
浓缩红细胞	254	9	3.54	16	6.30
全 血	2528	104	4.11	148	5.85
合 计	2850	119	4.18	171	6.00

2.5 血小板相关抗体检出率及其与NHTR的关系 测定了118例患者的血小板相关抗体，如以PAIgG、PAIgA、PAIgM、PAC3中任一项指标增高即为血小板相关抗体阳性计，则输血后血小板相关抗体的阳性率为39.83%（47/118）。并发NHTR组血小板相关抗体阳性率为31.58%（12/38），未并发NHTR组为43.75%（35/80），差异不显著（$x^2=1.59$，$P>0.05$）。

3 讨论

输血引起的不良反应中NHTR常见。本文

中输血后112/304(36.84%)合并NHTR，每单位血液成分NHTR的发生率为6%，与林氏[4]报道的7.4%相近，而较文献[2，5，6]报道的0.73%～3.8%为高。这可能与近年来白细胞、血小板等成分输血的比例增加，以及NHTR判断标准不完全一致有关。

有人认为，NHTR中70%由白细胞抗体引起，其中主要为HLA抗体[7]。文献报道[3，7，8]用标准的淋巴细胞毒试验检测，输血后受血者血清中HLA抗体的阳性检出率可达31～63%，本文结果为39.14%，其中24.37%能鉴定出抗体特异性；其余阳性血清与多个抗体鉴定配组细胞均反应，反应格局经计算机分析不能确定特异性，考虑系患者输多个供者混合血制品，产生复杂的HLA抗体，或抗体鉴定配组细胞不全等因素有关。本文统计并发NHTR组HLA抗体阳性检出率显著高于未并发NHTR组，HLA抗体阳性检出率随输血次数及献血者人数的增加而增高，提示HLA血型不合的输血与NHTR有密切联系。

反复输注不相容的血小板产生的同种免疫反应主要是HLA抗体所致，其次是血小板特异性抗体。临床主要表现为继后的血小板输注无效。因血小板同种免疫而引起的NHTR一般较轻微[8]。本文结果未显示血小板相关抗体与NHTR之间有明显的相关性。

对浓缩白细胞的输用各家有异议，主要因目前的采集方法所获粒细胞量很少，而HLA抗原又具多态性，抗原性强而复杂，极易产生同种免疫作用。本文比较了输用不同血液成分（全血、浓缩白细胞、浓缩红细胞）后血清中HLA抗体阳性检出率及NHTR的发生率，以输浓缩白细胞为最高，与Decary等[5]报道相符，因此对其临床应用应考虑到免疫学安全性。

为了预防或减少输血后NHTR，提高输血质量，提出以下建议：①掌握输血指征，权衡输血利弊。②积极推广成分输血，对于反复输血的患者，尽量采用少白细胞血，这样能有效地降低HLA同种免疫的发生率。③从免疫学角度考虑，新鲜血中含有的白细胞和血小板数量较多，抗原性完整，产生同种免疫的机率较库存血高，因此不必不加选择地一律输新鲜血。④反复输血后出现NHTR或输血无效时，同时做HLA配合与血小板交叉配合，可为产生同种免疫的患者选择合适的供者。如有条件建立HLA定型供者计算机检索库，必将为提供HLA相合的供血者创造有利条件。

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ENGLISH ABSTRACTS OF ORIGINAL ARTICLES

Effect of Transfusion with Stored Blood after Combined Radiation-Burn Injury on Immune Reaction of Allo-Skin Grafted Rats

Yan Yongtang, et al

(Combined Injury Research Section, Department of Hygienics, Third Military University)

The effect of post-injury transfusion with stored blood on the immune reaction of allo-skin grafted rats was treated, using models of the allo-skin grafted rats with simple burn injury (15% TBSA) and with combined radiation-burn injury (exposed to 5 Gy systemic irradiation, 15% TBSA) respectively. After burn injury and allo-skin graftment, the early cell immune function of the rats significantly enhanced, the survival time of all the allo-skin grafts was within 7 days. After the rats transfused with stored blood, the degree of their cell immune function enhancement was decreased, but there was no significant effect on the survival time of allo-skin grafts. However, in the case of allo-skin graftment subsequent to combined radiation-burn injury, and then transfusion with stored blood, the multiplying ability of thymocytes and the antibody-producing ability of splenocytes were depressed significantly and for a long time; the number of thymocytes, splenocytes, spleen B-cells, T-cells, T_H-cells and Ts-cells were decreased rapidly and recovered slowly. And the surviral rate of allo-skin grafts for 15 days was 100.0% which was remarkably higher than that of the group subjected to simple allo-skin graftment (28.6%, $P<0.01$), indicating that transfusion with stored blood after combined radiation-burn injury and allo-skin graftment played a role in depressing the enhanced immune reaction of the rats, which could lead to the prolonging of survival time of allo-skin grafts and was beneficial to the cure of whole injury condition.

Key words : Combined radiation-burn injury, Transfusion with stored blood, Allo-skin graftment, Immune reaction

(Original article on page 61)

Detection of HLA and Platelet-Associated Antibodies after Blood Transfusion and Its Meaning

Pan Xiuying, et al

(Affiliated Hospital of Xuzhou Medical College)

A standard microlymphocytotoxicity assay was used to test the sera for HLA antibodies in the patients receiving multitransfusions and to identify their specificity, and at the same time the platelet-associated antibodies were detected. As a

result, the dectable rate of HLA antibodies was 39.14% (119/304), of which 24.37% (29/119) had specificity; the positive rat platelet-associated antibodies was 39.83% (47/118). The frequency of positive incidence of HLA antibodies increased with the number of transfusions and donors, having a significant difference. The nonhemolytic reaction to transfusion was associated with HLA antibodies. The frequency of positive incidence of HLA antibodies was the highest when the patients were transfused with concentrated granulocytes. There were taken some measures to prevent and reduce the transfusion reaction.

Key words: Blood transfusion, HLA antibody, Platelet-associated antibody, Nonhemolytic reaction to transfusion

(Original article on page 65)

Preliminary Treatment of Separating Albumin from Autoplasma by Heating

Zhow Yuanguo, et al
(Nanjing Red Cross Blood Center)

A safe and effective method for separating albumin from autoplasma by heat was introduced. Immunological analysis showed that such an albumin solution had the same identity as human serum albumin. Determination by acetate cellulose electrophoresis showed that the purity of the albumin was over 90%. Determination by polyacrylamide gel electrophoresis showed that one of the albumin monomers was over 97%. Detection by double radial immunodiffusion indicated that there were no any new antigens in it. The recovery of the albumin was more than 80%.

Key words: Plasmapheresis, Plasma-exchange, Albumin solution, Immune disease

(Original article on Page 68)

Investigation on Donors' Blood Lipoids, Blood Composition and Hemorrheological Indexes

Xin Huanhe, et al
(Department of Neurology, Jining Medical Collage)

A comparison between 70-blood-donor and 70-health-control blood lipoids, blood composition, and hemorrheological indexes by paired analysis method based on occupation, sex and age was made. Paired T-test showed that though several indexes of the blood donors reduced remarkably, they were still within the normal physiological limits; There were no abnormal findings through physical examination and ECG, indication that according to the general physique and present diet conditions of Chinese population. It is safe to donate 300ml blood once at intervals of

(下接第120页)