期末報告投影片說明

內容應包含:

1. Introduction: 問題背景介紹
2. Materials and Methods: 資料來源、變數介紹、分析方法
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4. Conclusion

The risk factors for the Transplantation failure in Bone marrow transplants

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1. Introduction

Bone marrow transplants (骨髓移植): a standard treatment for acute leukemia(急性白血病)

Recovery following bone marrow transplantation, complex process

- Risk factors: patients/donor age/sex, stage, time from diagnosis to transplantation,…
- Occurrence of events at random times during the recovery process: GVHD (移植物對抗宿主疾病), return of the platelet count(血小板計數) to normal levels, return of granulocytes(顆粒性 白血球) to normal levels, infections

Transplantation failure: leukemia returns (relapse), dies while in remission(疾病緩解期)(treatment related death)

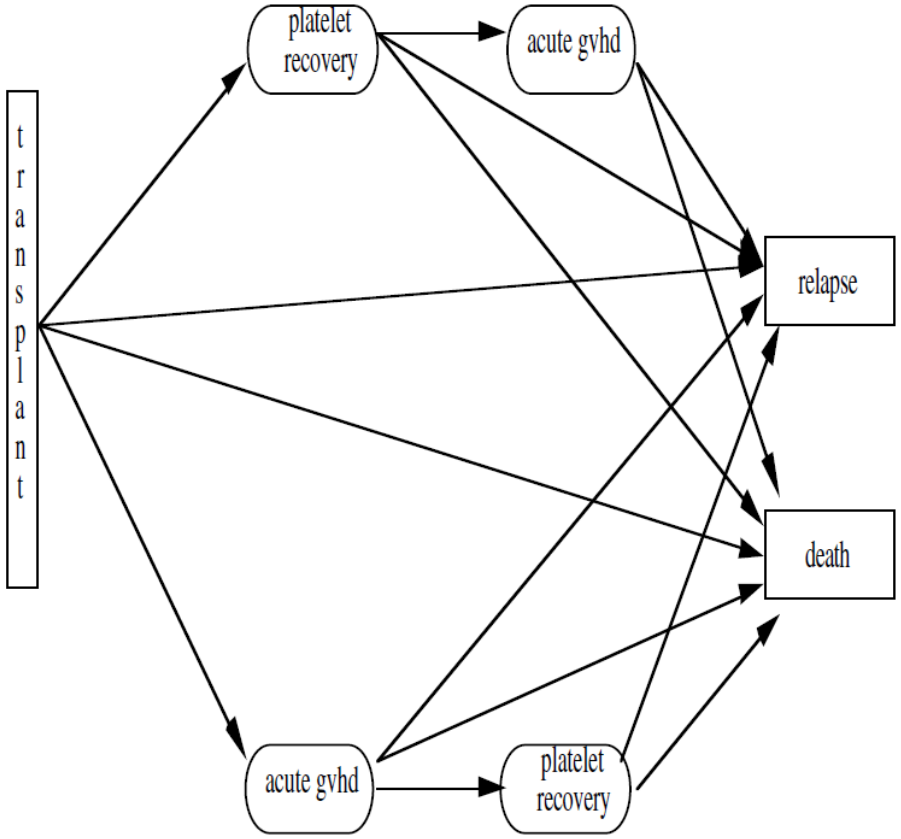


Figure 1.1 *Recovery Process from a Bone Marrow Transplant*

2. Materials and Method

Data from:

- Section 1.3, Textbook
- R package “KMSurv”, bmt

Survival time	t	d
Time to death	t1	d1
Disease free survival	t2	d3
Time to relapse	t2	d2

	Risk factors (baseline information)
z1	Patient age (years)
z2	Donor age (years)
z3	Patient sex
z4	Donor sex
z5	Patient CMV Status
z6	Donor CMV Status
z7	Waiting Time to Transplant in Days
z8	FAB
z9	Hospital
z10	MTX Used as a Graft-Versus-Host-Prophylactic

Method

The survival curve estimation: Kaplan-Meier estimator

The relationship between survival time and the risk factors: proportional hazard model

Variable selection: AIC criteria

Testing the differences between two survival curve: log-rank test

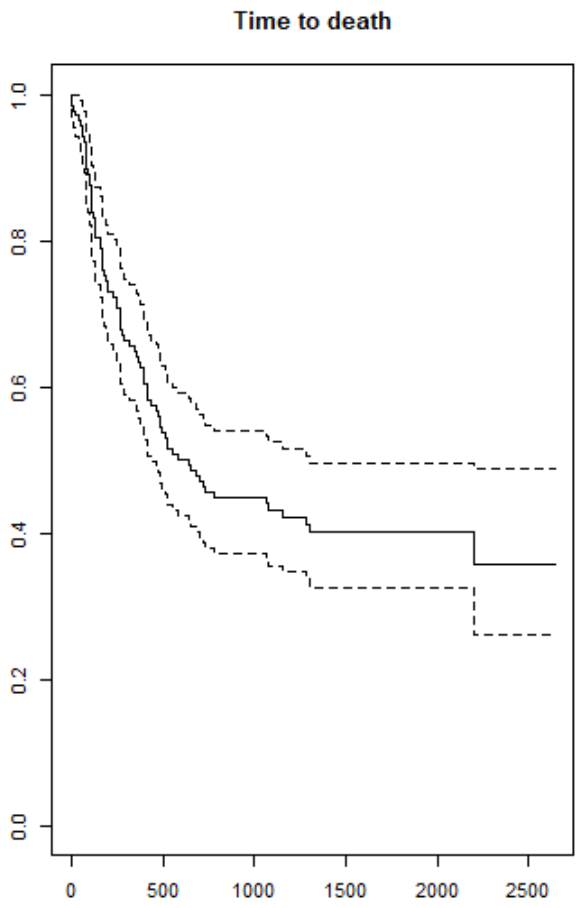
3. Results

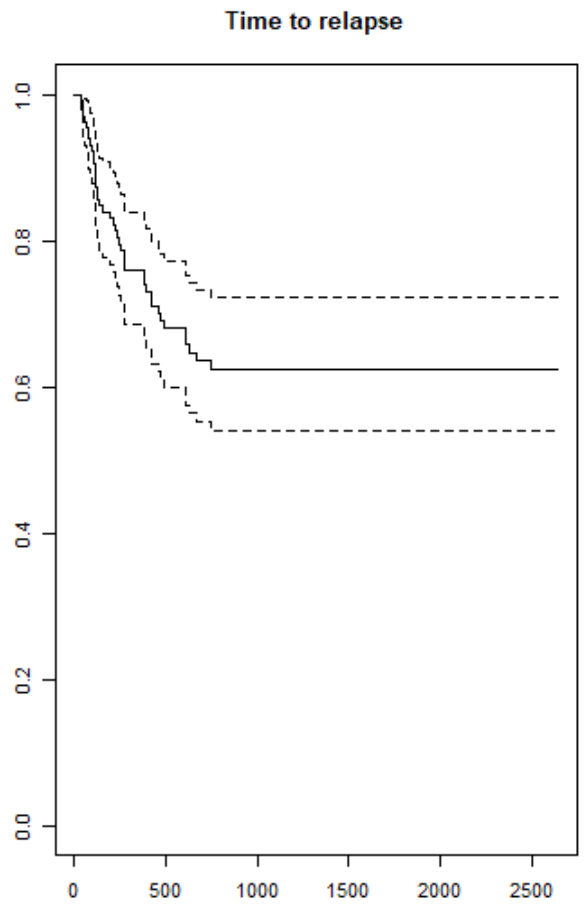
- Characteristic Tables

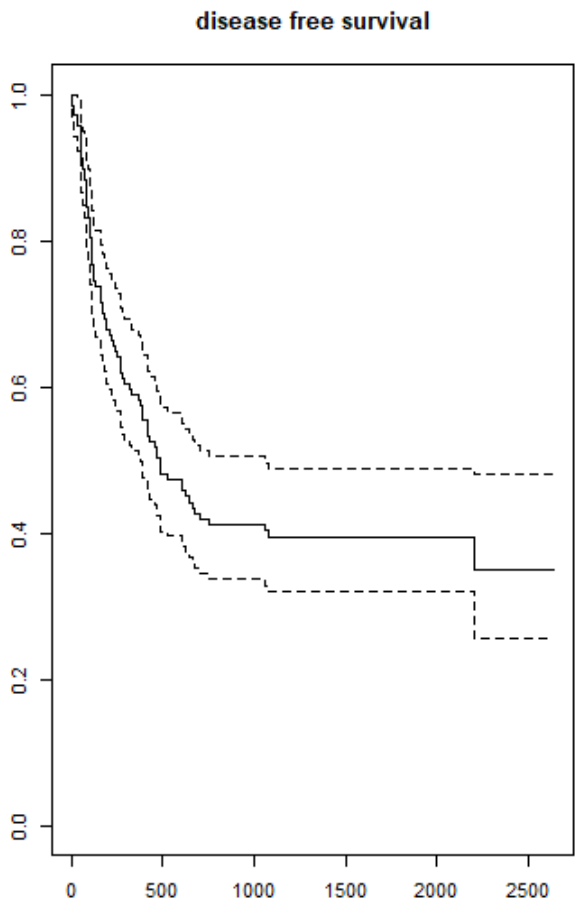
Variable	N=137	%
group		
ALL	38	0.28
AML low risk	54	0.39
AML hight risk	45	0.33
Time to death, median	547	
Time to relapse, median	467	
Status		
death	81	0.59
relapse	42	0.31
dead or relapsed	83	0.61

Variable	N=137	%
Patient age (years), mean/sd	28.4	9.6
Donor age (years), mean/sd	28.3	10.2
Patient sex		
Female	57	0.42
Male	80	0.58
Donor sex		
Female	49	0.36
Male	88	0.64
Patient CMV Status		
Negative	69	0.50
Positive	68	0.50
Donor CMV Status		
Negative	79	0.58
Positive	58	0.42
Waiting Time to Transplant in Days	178	
FAB		
Grade 4 or 5 and AML	92	0.67
others	45	0.33
Hospital		
The Ohio State University	76	0.55
Alferd	17	0.12
St.Vincent	23	0.17
Hahnemann	21	0.15
MTX Used as a Graft-Versus-Host- Prophylactic		
Yes	97	0.71
No	40	0.29

Survival Curve (KM-estimator)



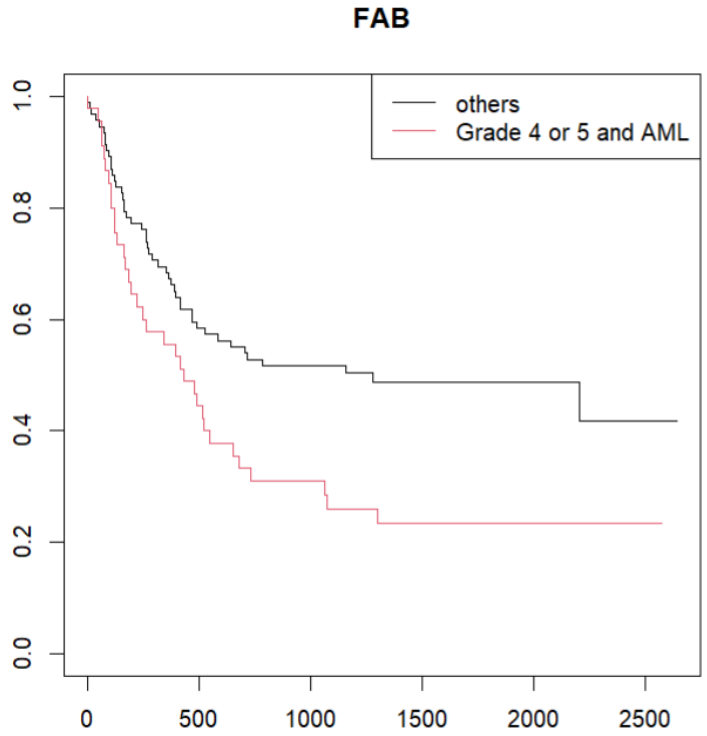


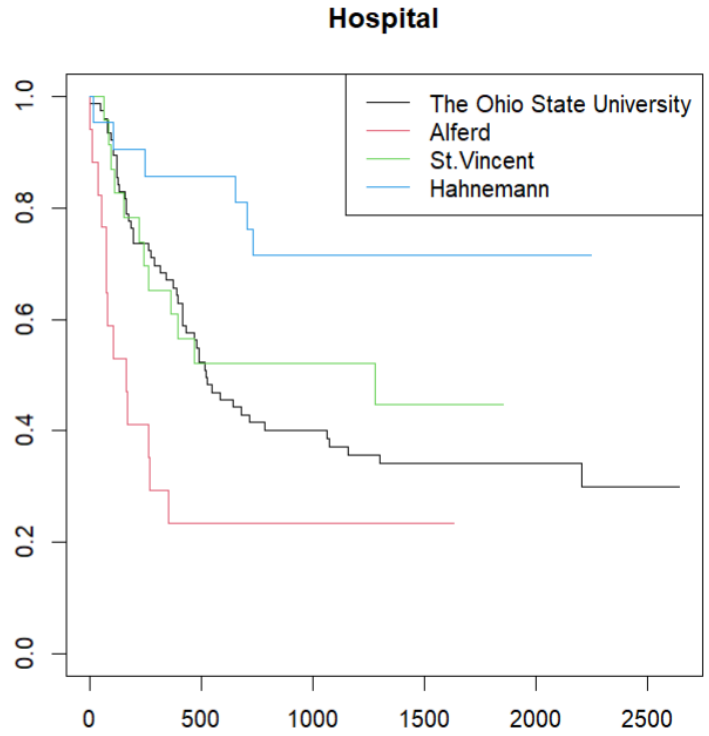


Time to death:

	marginal effect			joint effect		
Variable	coef	exp(coef)	Pr(>|z|)	coef	exp(coef)	Pr(>|z|)
group						
ALL	reference					
AML low risk	-0.655	0.519	0.026			
AML hight risk	0.370	1.448	0.166			
Patient age (years), mean/sd	0.012	1.012	0.300	0.033	1.033	0.009
Donor age (years), mean/sd	0.022	1.022	0.080			
Patient sex						
Female	reference					
Male	-0.241	0.786	0.282			
Donor sex						
Female	reference					
Male	-0.029	0.971	0.899			
Patient CMV Status						
Negative	reference					
Positive	0.143	1.154	0.520			
Donor CMV Status						
Negative	reference					
Positive	0.051	1.052	0.821			
Waiting Time to Transplant in Days	0.000	1.000	0.889			
FAB						
others	reference			reference		
Grade 4 or 5 and AML	0.576	1.779	0.011	0.736	2.088	0.001
Hospital						
The Ohio State University	reference			reference		
Alferd	0.740	2.097	0.018	0.873	2.394	0.006
St.Vincent	-0.210	0.811	0.515	-0.313	0.731	0.338
Hahnemann	-1.081	0.339	0.013	-1.277	0.279	0.004
MTX Used as a Graft-Versus-Host- Prophylactic						
No	reference					
Yes	0.361	1.435	0.135			

FAB: 常用的法英美白血病分類法





groups	Log-rank test p-value
“Others” vs “Grade 4 or 5 and AML”	0.01

groups	Log-rank test p-value
“The Ohio State University” vs “Alferd”	0.01
“The Ohio State University” vs “St.Vincent”	0.5
“The Ohio State University” vs “Hahnemann”	0.006
“Alferd” vs “St.Vincent”	0.02
“Alferd” vs “Hahnemann”	6×10^{-4}
“St.Vincent” vs “Hahnemann”	0.08

4. Conclusion

我們探討那些 risk factors 會影響器官移植到死亡的存活時間，得到病人年齡 (patient age)、FAB分類結果、及病人所在醫院對存活時間的影響效果顯著。

病人器官移植時的年齡增加，預期會減少存活時間

病人的 FAB 分類為”Grade 4 or 5 and AML”的分類類別較其他類別存活時間短。

一般來說，所在醫院為 Alferd 的病人存活率最低，在Hahnemann醫院的病人存活率最高。

Thank you!