Prognosis

1

Concepts to take home

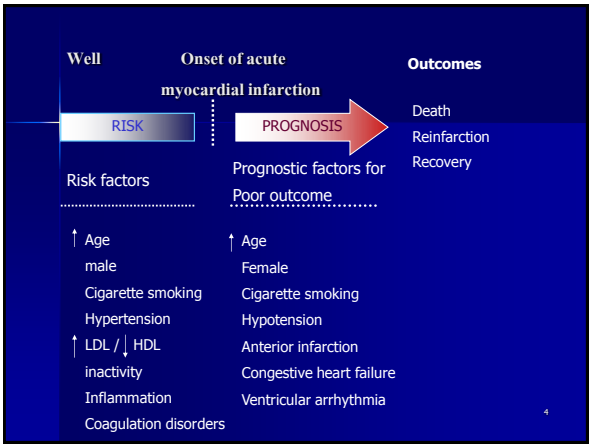
- Prognostic factor vs risk factor
- Type of studies
- Kaplan-meier estimation
- Prognosis checklists

2

Prognostic factor vs risk factor

- "Risk" or "risk factor" refers to the effect of an exposure or other factor on the development of disease
- "Prognosis" or "prognostic factor" refers to the influence of a factor on survival or development of another outcome

3



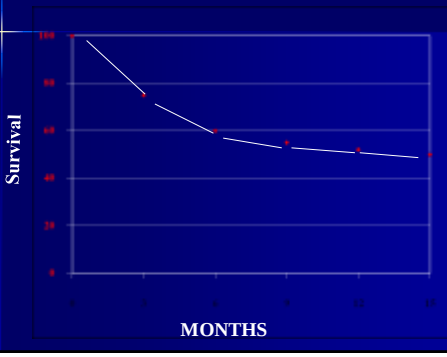
4

Prognosis usually measured in cohort studies

- Start with group that has a disease
- Separate into those with a suspected prognostic factor and those without it
- Look at survival at various points in time to see if those with the factor differ from those without it

5

What a curve looks like

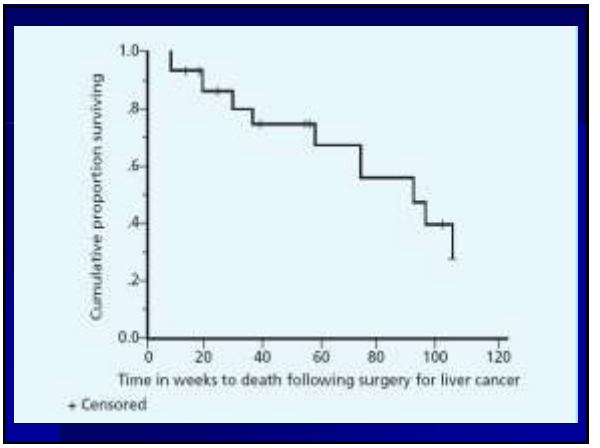


6

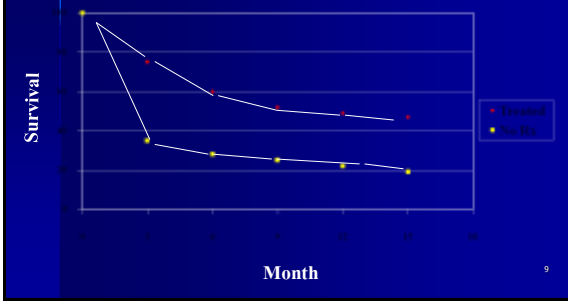
Table 1. Calculation of Kaplan-Meier estimate of the survivor function

A Time (weeks)	B Number at risk at start of study	C Number of deaths	D Number censored	E Proportion surviving until end of week	F Cumulative proportion surviving
10	18	1	0	1 – 1/18 = 0.9444	0.9444
13*	17	0	1	1 – 0/17 = 1.0000	0.9444
18*	16	0	1	1 – 0/16 = 1.0000	0.9444
19	15	1	0	1 – 1/15 = 0.9333	0.8815
23*	14	0	0	1 – 0/17 = 1.0000	0.8815
30	13	1	0	1 – 1/13 = 0.9230	0.8137
36	12	1	0	1 – 1/12 = 0.9167	0.7458
38*	11	0	1	1 – 0/17 = 1.0000	0.7458
54*	10	0	1	1 – 0/17 = 1.0000	0.7458
56*	9	0	1	1 – 0/17 = 1.0000	0.7458
59	8	1	0	1 – 1/8 = 0.8750	0.6526
75	7	1	0	1 – 1/7 = 0.8571	0.5594
93	6	1	0	1 – 1/6 = 0.8300	0.4662
97	5	1	0	1 – 1/5 = 0.8000	0.3729
104*	4	0	1	1 – 0/4 = 1.0000	0.3729
107	3	1	0	1 – 1/3 = 0.6667	0.2486
107+/107+	2	0	2	1 – 0/2 = 1.0000	0.2486

7

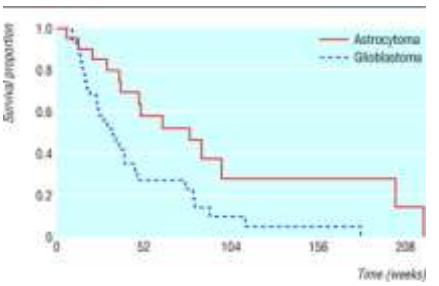


Comparing two curves over time



9

Survival curves for women with glioma by diagnosis



Bland, J M. et al. BMJ 2004;328:1073

BMJ

The logrank test is most likely to detect a difference between groups when the risk of an event is consistently greater for one group than another.

It is unlikely to detect a difference when survival curves cross, as can happen when comparing a medical with a surgical intervention.

When analysing survival data, the survival curves should always be plotted

Bland, J M. et al. BMJ 2004;328:1073 http://www.bmj.com/cgi/content/full/328/7447/1073

The logrank test is based on the same assumptions as the Kaplan Meier survival curve[3]—

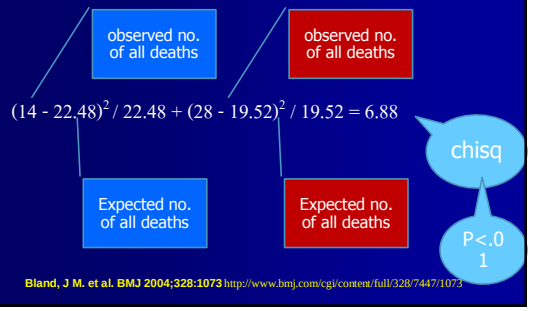
1. censoring is unrelated to prognosis,
2. the survival probabilities are the same for subjects recruited early and late in the study,
3. the events happened at the times specified.

Deviations from these assumptions matter most if they are satisfied differently in the groups being compared, for example if censoring is more likely in one group than another.

Bland, J M. et al. BMJ 2004;328:1073 http://www.bmj.com/cgi/content/full/328/7447/1073

Logrank test for survival curves for women with glioma

The logrank test is used to test the null hypothesis that there is no difference between the populations in the probability of an event (here a death) at any time point



Bland, J M. et al. BMJ 2004;328:1073 http://www.bmj.com/cgi/content/full/328/7447/1073

Prognosis Checklists for Validity

Was there a representative and well-defined sample of patients at a similar point in the course of disease?

- Inclusion and exclusion criteria?
- Selection biases?
- Stage of disease?

14

Prognosis Checklists for Validity

Was follow-up sufficiently long and complete?

- Reasons for incomplete follow-up?
- Prognostic factors similar for patients lost- and not lost-to-follow-up?

15

Prognosis Checklists for Validity

Were objective and unbiased outcome criteria used?

- Outcomes defined at start of study?
- Investigators 'blind' to prognostic factors?

Was there adjustment for important prognostic factors?

16

Prognosis Checklists for Result

What are the results?

- How likely are the outcomes over time?
  - Survival curves (Kaplan-Meier)?
- How precise are the estimates of likelihood?
  - Confidence intervals?
- Did the study have a sufficiently large sample size?

17

Prognosis Checklists for Applicability

Will the results help me in patient care?

- Were the study patients similar to my own?
  - Patients similar for demographics, severity co-morbidity and other prognostic factors?
  - Compelling reason why the results should not be applied?
- Will the results lead directly to selecting therapy?
- Are the results useful for reassuring patients?

18