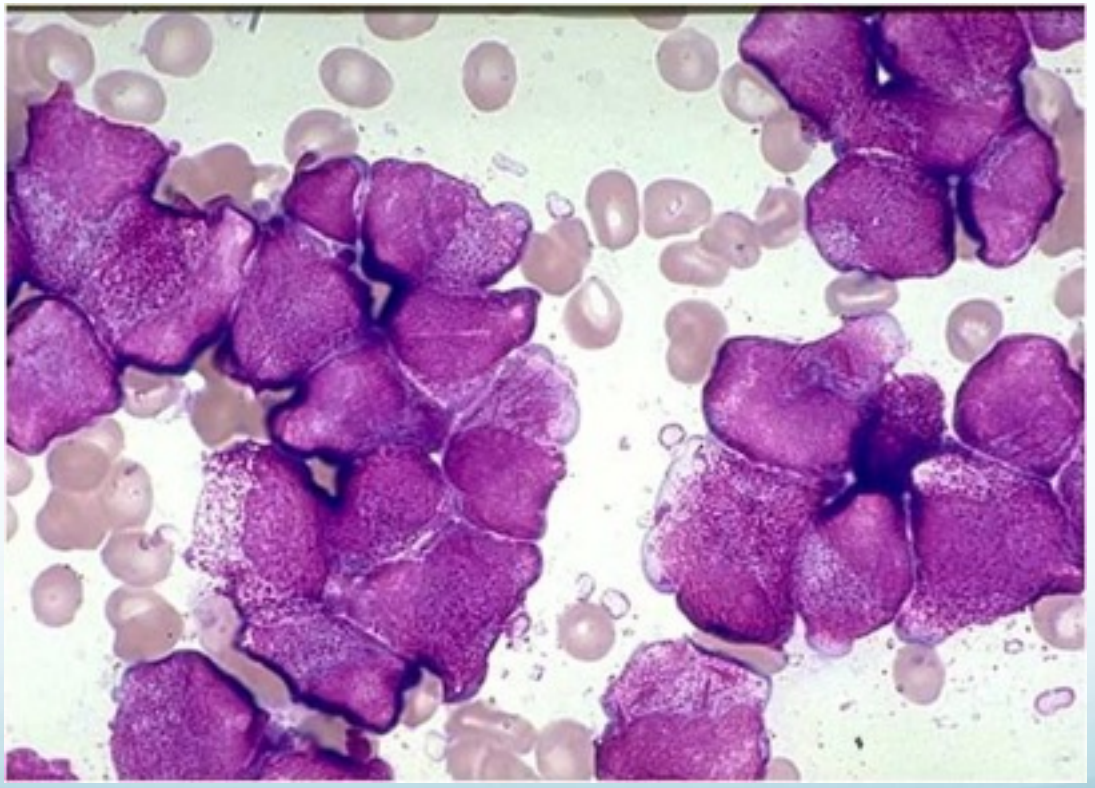
The critically ill haematology patient

Time to think differently?



Background

- The number of patients living with HMs has increased over last 2 decades
- Patients with HMs require admission to ICU for life threatening events related to
  - Complications related to malignancy
  - Complications related to treatment
  - Complications due to immunosuppression

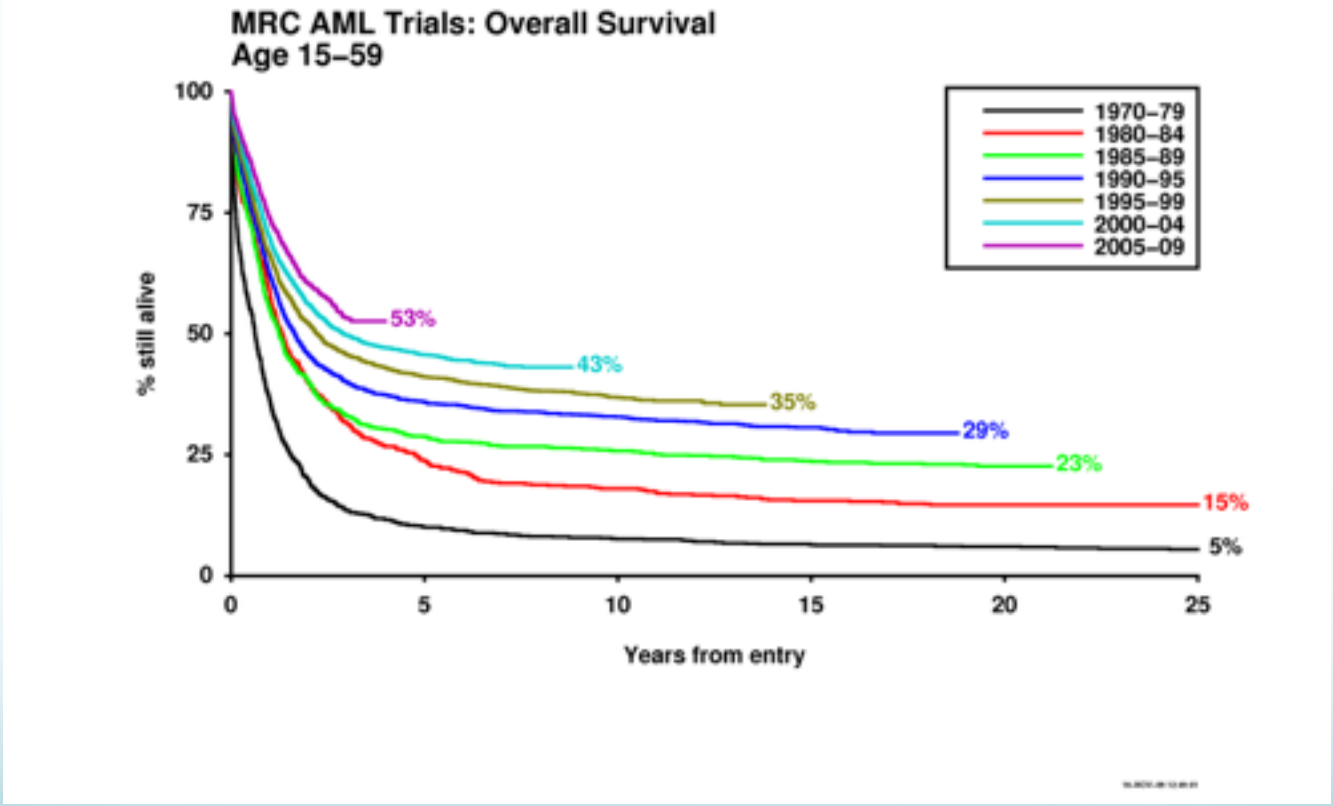
Patient: 23 years old

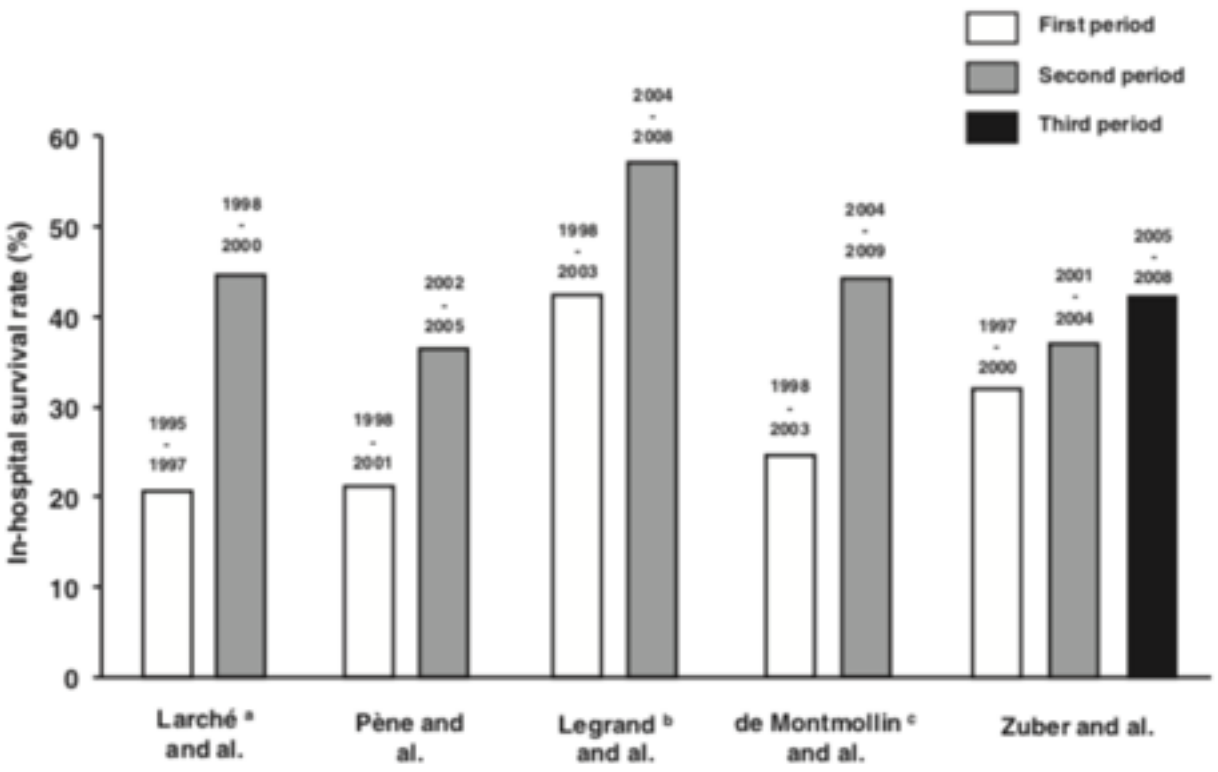
- Relapsed Hodgkins and allograft
- Previous ICU admission with Klebsiella pneumonia
- D + 15 post transplant
- In extremis: oxygen sats 85% on FIO2 1.0, BP 60/45
- ICNARC ICU predicted mortality 55%

Overview for today

- Outcomes
- Triaging admission to ICU
- Defining treatment goals in ICU
- Collaborative approach

AML survival





[a] 30-day survival rate

[b] Included neutropenic patients with severe sepsis or septic shock

[c] Only included patients with septic shock of pulmonary origin

urvival of septic shock in patients with cancer managed in GrrrOH-affiliated centers. GrrrOH designates *Groupe de Recherche Respiratoire en Réa*
ber's was a multicenter study.

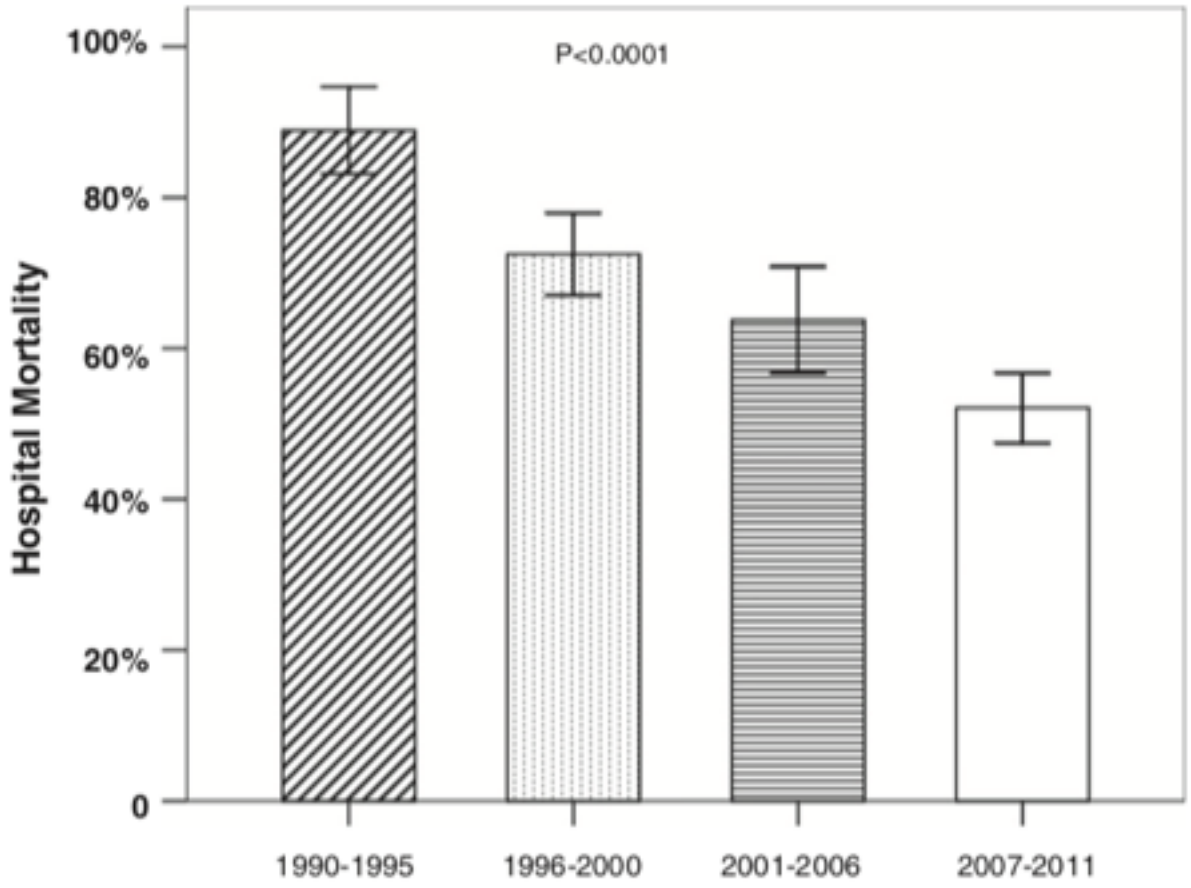


Fig. 2. Hospital mortality in 1004 patients with ARDS managed in GrrrOH-affiliated centers according to period of intensive care unit admission. Figure from Azoulay et al. [27] published in Intensive Care Medicine and copied here with permission. GrrrOH designates *Groupe de Recherche Respiratoire en Réanimation Onco-Hématologique*.

Predicting ITU outcome

- Historic data
- Retrospective
- Single centres
- Conflicting data

Authors	Year	No. of patients	Mortality (%)			Prognostic indicators
			ICU	In-hospital	6 months	
Lloyd-Thomas and colleagues[3]	1988	60	63	78	N/A	APACHE II score, failure of malignancy to respond to chemotherapy, number of organ failures, leucopenia
Brunet and colleagues[4]	1990	260	43	57	81	SAPS II score, >1 organ failure, intractable sepsis
Yau and colleagues[15]	1991	92	N/A	77	N/A	Disease progression
Staudinger and colleagues[21]	2000	414	53	N/A	N/A	Respiratory insufficiency, mechanical ventilation, septic shock
Massion and colleagues[20]	2002	84	38	61	75	Respiratory failure, fungal infection, number of organ failure, transplant status
Kroschinsky and colleagues[19]	2002	104	44	N/A	67	SAPS II score, mechanical ventilation, C-reactive protein
Benoit and colleagues[6]	2003	124	42	54	66	Leucopenia, vasopressor use, urea >0.75
Owczuk and colleagues[16]	2005	40	65	N/A	N/A	SAPS II score, SOFA score, APACHE II score, neutropenia, thrombocyte count, mean arterial pressure, and necessity of catecholamine administration
Lamia and colleagues[18]	2006	92	N/A	58	N/A	SAPS II, LODS, ODIN, SOFA scores
Lim and colleagues[23]	2007	55	69	N/A	N/A	Bilirubin, inotropic support, multiple organ failure
Cuthbertson and colleagues[8]	2008	714	39	55	N/A	Cardiopulmonary resuscitation within 24 h, mechanical ventilation, inotropic support, APACHE II score
Hampshire and colleagues[11]	2009	7689	43	59	N/A	Age, length of hospital stay before ICU admission, severe sepsis, Hodgkin's lymphoma, transplant, tachypnoea, low Glasgow Coma scale, systolic hypotension, sedation, Pa_{O2}:Fi_{O2} ratio, acidaemia, oliguria, hyponatraemia, hypernatraemia, haematocrit, uraemia, alkalaemia

Predicting outcome: old myths

- Age
- Disease status
- Neutropenia
- Sepsis
- Recent chemotherapy
- Mechanical Ventilation
- Renal replacement therapy
- ICU predicted mortality score

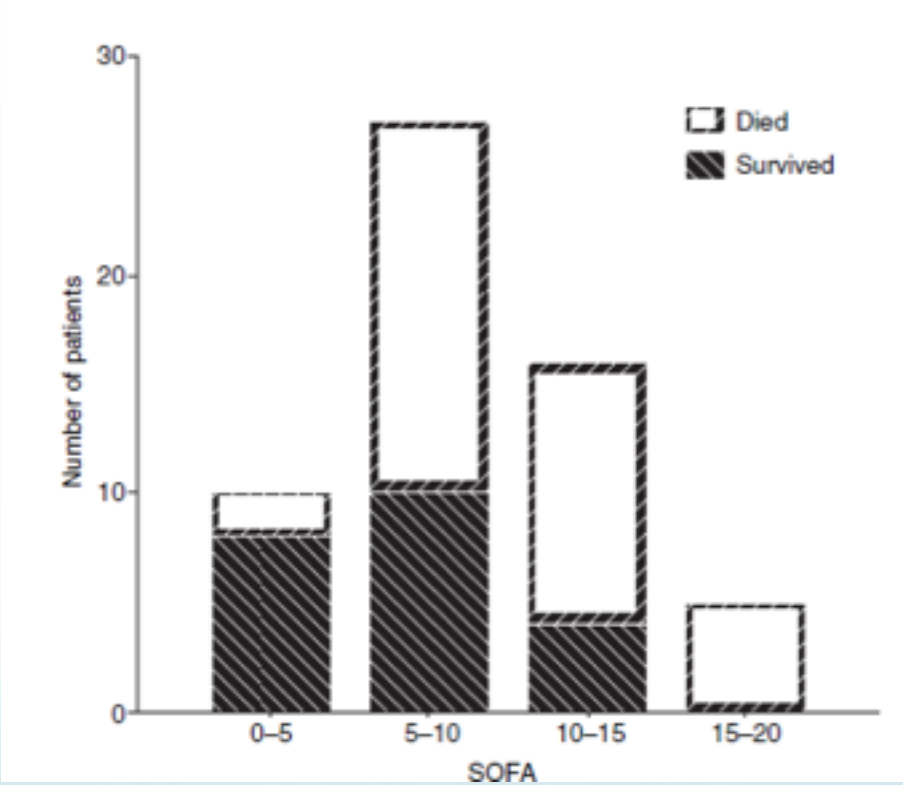
Outcome: no change

1. Bedridden patients
2. No lifespan extending treatment options
3. Elderly patients with significant comorbidities
4. Patients with multiple comorbidities
5. Less than 6months life expectancy
6. Allogeneic BMT/HSCT with uncontrolled GVHD
7. Invasive pulmonary aspergillosis requiring MV
8. Persistent MOF
9. Newly diagnosed unresponsive to chemo on ICU
10. Recurrent life threatening event post discharge from ICU+/- residual organ dysfunction

What *does* predict outcome

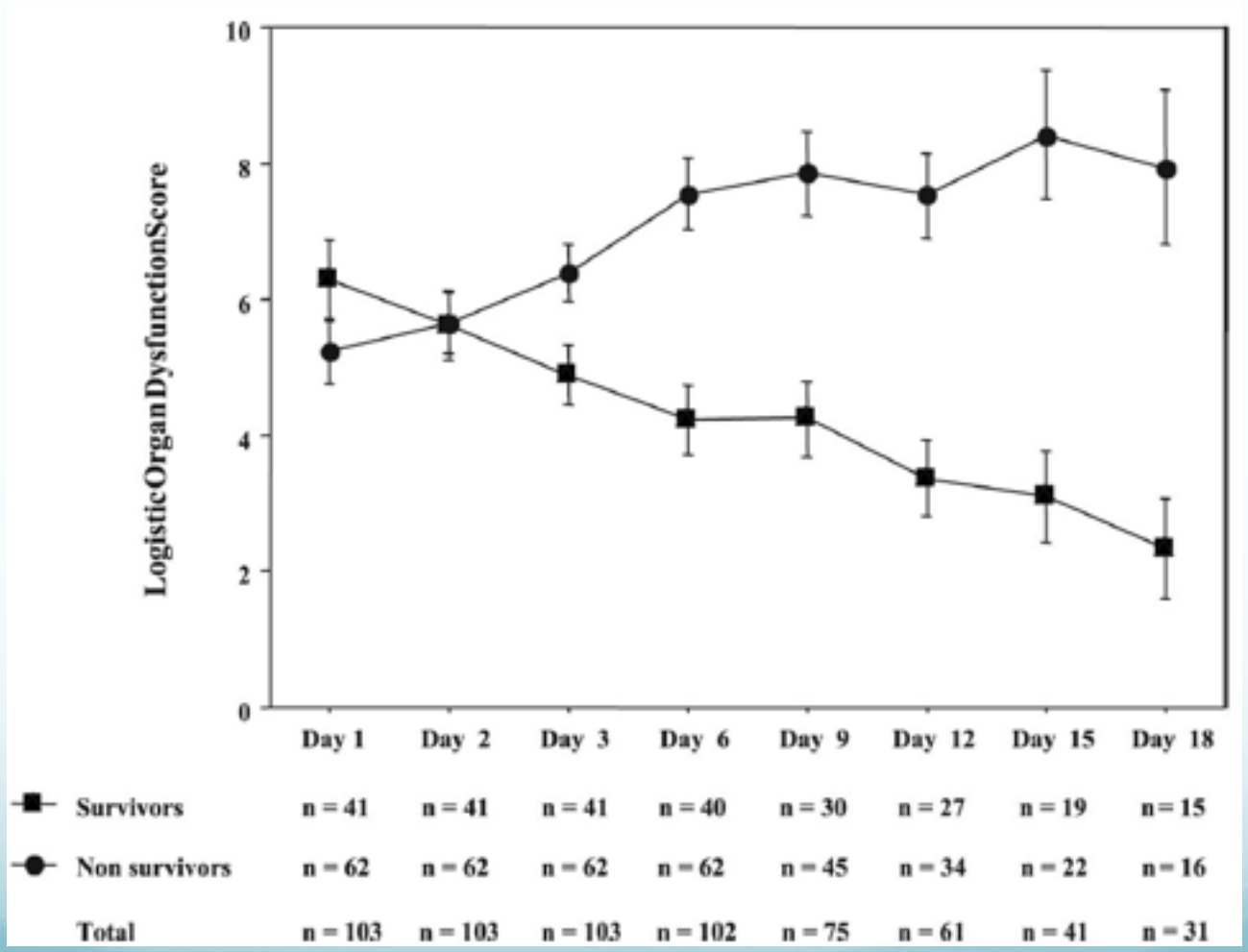
- Organ failure
- Progression of organ failures
- Allogeneic BMT Recipients

Initial SOFA score



Cornet et al, Eur J Haematol 2005

Progression of organ failures



Predicting outcome in ICU

- Good outcome
  - **Autograft**
  - Younger age
  - Respiratory failure
    - Pulmonary Oedema
    - Bacterial Pneumonia
  - Ventilation for less than 7 days
- Poor outcome
  - **Allograft**
    - GVHD, VOD
  - Increasing Age
  - Respiratory failure
    - DAH
    - IPS
    - BOOP
    - CMV, RSV
    - Aspergillosis
  - Ventilation for more than 7 days

Triaging admission to ICU

- Admit and full escalation of organ support
  - Pre-engraftment
  - No recurrence
- Trial of organ support
  - Unknown disease status
  - Recurrence with available treatment options
- Refusal
  - Disease recurrence with no treatment options
  - Bedridden
  - Severe GVHD

Treatment goals in ICU

- Non-invasive diagnostic and therapeutic strategies
- Remove indwelling lines in septic shock
- Combination therapy (aminoglycosides)
- Monitor levels of organ support

BSH and ICS

Guidelines for admission and management of critically ill haematology patients (2015)

But…

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REVIEW

Managing critically Ill hematology patients: Time to think differently

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Standard of Care

- **What to do**
  - *Optimal life support based on most recent data from general ICU patients*
  - *Noninvasive diagnostic and therapeutic strategies*
  - *Close collaboration between intensivists and hematologists*
- **What to Consider**
  - *New ICU admission policies (prophylactic ICU admission, palliative noninvasive ventilation)*
  - *Start induction chemotherapy in the ICU in high risk patients*
  - *Medical emergency teams*
  - *Minimally invasive (CT-driven), diagnostic procedures*
- **What to encourage**
  - *Early ICU admission*
  - *Improve our understanding of pathophysiology and of toxicities of newly released drugs*
  - *Cytoreduction therapy in hyperleukocytic AML*
  - *Combination therapy (aminoglycosides) in septic shock*
  - *Catheter withdrawal in septic shock from unknown origin*
  - *ICU trial*
  - *Rehabilitation programs*
  - *Respect patient's preferences and provide early in-ICU palliative care*
- **What not to do**
  - *Delayed ICU admission*
  - *Alcalinization in tumor lysis syndrome*
  - *Inappropriate use of nephrotoxic agents (contrast agents, antibiotics, etc…)*
  - *Prolonged noninvasive ventilation in hypoxemic patients meeting criteria for ARDS*
  - *Bronchoscopy and bronchoalveolar lavage in deeply hypoxemic patients for whom a noninvasive diagnostic test is available*
  - *Premature end-of-life decisions*
- **What to evaluate**
  - *Noninvasive ventilation, blood transfusion policies,*
  - *Effectiveness of new diagnostic tests*
  - *Impact of cytogenetics and molecular biology on organ dysfunction (e.g., in AML or lymphoma…)*
  - *Triage criteria by hematologists for ICU referral*
  - *Current risk factors for adverse events (invasive fungal infections, mortality)*
  - *Long term outcomes (survival, disease control, quality of life, post-ICU burden)*
  - *Decision-making for patients with prolonged ICU stays*

Variation in morality

- Volume of cases
- Presence of haematologist
- Cytogenetics and organ dysfunction
- Criteria used by haematologist for ICU referral

New admission policies

- Early admission may increase survival or prevent progression of organ failures
- When is ‘early’ early enough?
- Prophylactic admission for high risk patients?
- Review admission policies e.g.allografts?

Non invasive ventilation

- What is the benefit?
- Does it delay treatment?
- NIV versus HFN?
- Palliative NIV?

Trial of organ support

- How long for?
- Risks disproportionate care
- Applying findings from studies to individual patients

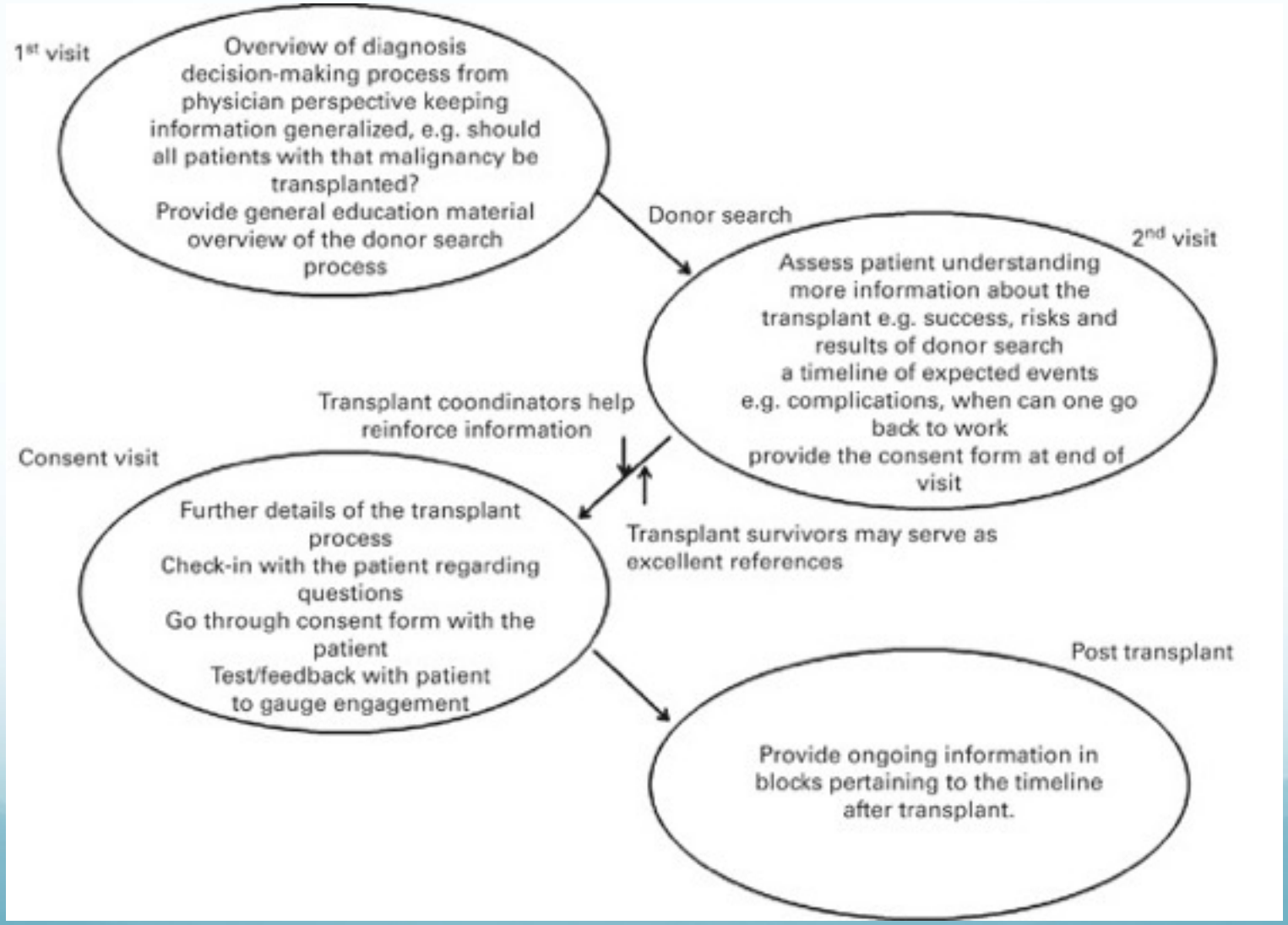
Longer term outcomes

- Risk factors for adverse events in ICU
- Disease burden and control
- QUALY
- Decision making for patients with long stay

Frailty

- Common across all ages
- Association with high disease burden, early non-relapse morbidity, late death post transplant
- Frailty phenotype?
- Assessment? Prehabilitation? Follow-up?

Consent


1st visit
Overview of diagnosis
decision-making process from physician perspective keeping information generalized, e.g. should all patients with that malignancy be transplanted?
Provide general education material overview of the donor search process
Donor search
2nd visit
Assess patient understanding
more information about the transplant e.g. success, risks and results of donor search
a timeline of expected events e.g. complications, when can one go back to work
provide the consent form at end of visit
Transplant coondinators help reinforce information
Consent visit
Further details of the transplant process
Check-in with the patient regarding questions
Go through consent form with the patient
Test/feedback with patient to gauge engagement
Transplant survivors may serve as excellent references
Post transplant
Provide ongoing information in blocks pertaining to the timeline after transplant.

Freeman

Transplant MDT

Collaborative approach

Early ICU input

Communication

Conclusions

- ICU and one year mortality rates are improving
- Short term outcome is predicted by severity of acute illness
- ICU trial with reappraisal of organ failure scores after 5 days
- Collaboration and clear communication is crucial
- Further research is needed

Thank you