

The management of fever in critical care

A critical examination of the research evidence for contemporary practice

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Aims

- Review role of fever
- Consider physiological effects of fever in critical illness
- Examine evidence base for fever interventions
- Explore reasons given for fever treatment
- Outline implications for contemporary practice

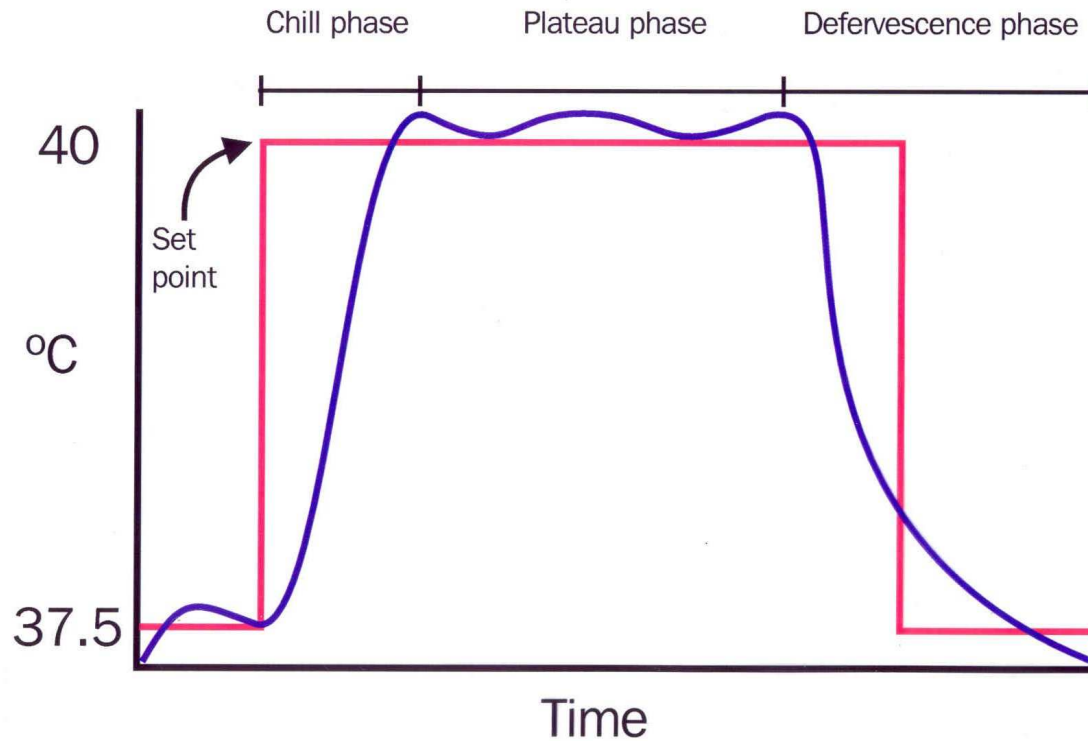
Fever

“The development of a higher-than-normal body temperature following the invasion of the body by microorganisms or foreign substances”

Seeley, Stephens and Tate, 2003

Fever

The Febrile Response



"Set Point" Theory

Physiological effects of fever

- Febrile patients hypermetabolic ($p=0.0001$)
- Higher temperature = higher energy expenditure ($p<0.0001$)
Frankenfield et al, 1997
- Increased heart rate ($p<0.001$)
Kiekkas et al, 2007
- Non-significant decrease in MAP ($p>0.05$)
Pernerstorfer et al, 1999

Fever in critical care

Febrile patients are more likely to:

- Have organ failure ($p < 0.0001$)
- Have SIRS ($p < 0.0001$)
- Stay longer in ICU and hospital ($p < 0.0001$)
- Die ($p < 0.0001$)

Barie et al, 2004

Fever in critical care

- Longer fever duration = increased risk of mortality
($p < 0.0001$)

Circiumaru et al, 1999

- Paracetamol can increase the duration of some fevers
($p < 0.001$)

Plaisance et al, 2000

- Most patients afebrile in 24 hrs with or without treatment
($p < 0.001$)

Gozzoli et al, 2001

Fever in critical care

Found that febrile volunteers:

- Were uncomfortable
- Experienced shivering ($p=0.007$)

Lenhardt et al, 1999

What happens in local practice?

- Nurses often want “to do”
- Paracetamol administered
- Cooling applied

Evidence based practice?

Paracetamol for fever

- Paracetamol administration made no difference to:
 - SIRS ($p=0.07$) or MODS ($p=0.78$)
 - Peak (maximum) temperature ($p=1.0$)
 - Number of ventilator days ($p=0.521$)
 - ICU LOS ($p=0.69$)
 - Showed a trend towards increased mortality ($p=0.06$)

Schulman et al, 2005

Paracetamol for fever

- Lower levels of chills and perception of fever ($p=0.021$)
- Reduce temperature increases ($p=0.001$)
- Reduce HR increases ($p=0.02$)

Pernerstorfer et al, 1999

Cooling for fever

Made no difference to:

- SOFA (p=0.26) or SAP (p=0.52) scores
- Discomfort levels (no p value given)
- Recurrence of fever (p=0.39)
- ICU (p=0.59) or hospital LOS (p=0.69)
- Mortality (p>0.99)

Gozzoli et al, 2001

Cooling for fever

Cooled febrile volunteers:

- Were uncomfortable and shivered ($p=0.0001$)
- Had similar temperatures
- Had similar HR
- Higher MAP ($p<0.05$)
- Higher oxygen consumption ($p<0.0001$)
- Increased energy expenditure

Lenhardt et al, 1999

Reasons given for fever treatment

- Fever causing fitting
- Fever increasing strain on CVS
- Fever increasing BMR
- Patient comfort
- Speed recovery and reduce illness
- Reduce mortality

Ethical implications

- Paracetamol increasing sickness and mortality
- Patient dignity
- Unnecessary interventions

Cost implications

- Nursing time
- Cooling costs in electricity
- Unnecessary drug costs

Conclusions

- Fever is a normal response to infection
- Febrile patients are sicker and more likely to die
- Fever treatment not evidence based
- Ethical and cost implications
- What next?

Thank you

Any questions?