รายงานผู้ป่วย

Endocardial candidiasis in a burn patient

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A 20-year-old Thai woman was referred from a provincal hospital because of skin burns (2nd-3rd degree) over about 50% of the body surface area. The patient developed infected burn wounds and Staphylococcus aureus septicemia. But after the patient recieved both symptomatic and large - dose antibiotics, her condition deteriorated and she expired after 92 days of hospitalization.

Autopsy revealed Candida endocarditis of the tricuspid valve as a huge "ball valve" and Candida myocarditis of the nearby cardiac muscle. Post-mortem heart blood culture yielded Candida species (but not C. albicans)

Key words : Endocardial candidiasis, Burn

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มีผู้ป่วยหญิงไทย อายุ 20 ปี มาโรงพยาบาลจุฬาลงกรณ์เพราะบาดแผลไฟไหม้จากถังน้ำระเบิด ปริมาณเนื้อที่ 50% ของผิวหนังของร่างกาย (2-3 degree) ในขณะที่ผู้ป่วยได้รับการรักษาในโรงพยาบาล ผู้ป่วยมีอาการบาดแผลติดเชื้อและโลหิตติดเชื้อ ซึ่งตอนแรกเป็น Staphylococcus aureus แต่ได้รับการรักษาจนอาการโลหิตเชื้อหายไป แต่ผู้ป่วยก็อาการเลวลง และถึงแก่กรรมภายหลังอยู่ในโรงพยาบาลได้ 92 วัน ผลการตรวจศพพบว่ามีการอักเสบลิ้นหัวใจ Tricuspid จากเชื้อรา Candida Endocarditis เป็นก้อนขนาดต่าง ๆ และก้อนใหญ่สุดกลมขนาด 4×3 ซม. ลักษณะคล้าย ball valve และผลการเพาะเลี้ยงเชื้อจากเลือดหลังตายเป็น Candida species (not C. albicans)

Thermal injuries (burns and scalds) remain a prominent cause of death both in civilian life and in modern warfare. However, the chances of surival have changed since World War II. Since 1941, it was generally expected that a burn involving 50 per cent or more of the body surface would be fatal.[1]

Burns are commonly classified according to the depth of tissue destruction, i.e. from first to fourth degree, as is widely known. The extent of burns should be specified by using the "rule of nines". The severity depends directly on both the intensity of the heat and duration of exposure. Among other factors, the temperature in a fire depends on the substance burning. An ordinary house fire generally does not exceed 1,200°F.

When a bomb exblodes, the temperature of the explosive gases can exceed 2,000°C and the extreme heat radiated momentarily can cause "flash burns".[2]

Liquids at a temperature above 130°F can cause injury to skin (scald). In contrast with burns, death is rarely immediate from scalds and there is no destruction of the vicinity.[3]

Case report

A 20-year-old Thai woman was referred from a provincial hospital because of skin burns caused by a burst of flame from an oil tank. Physical examination revealed a young Thai woman with second to third degree burns on the face, anterior chest, trunk and upper extremities; the surface area of burned skin was estimated to be about 50 per cent.

Blood pressure was 100/50 mmHg, pulse rate was 120/min, respiration rate was 20/min and body temperature was 101°F. Laboratory analysis (breift selections from the chart).

Month in hospital

Blood	**1st**	**2nd**	**3rd**	
Hct	49	44	26	vol %
Hb	7.8	11.1	6.9	g
Wbc	21,800	11,500	12,200	cu mm.
N	47	34	95	%
band	34	36	32	%
L	19	30	2	%
B	–	–	3	%
Blood sugar	127	–	164	mmol/L
Blood urea nitrogen	21	–	15	mmol/L
Creatinine	0.5	–	10	mmol/L
Na	139	–	137	mmol/L
K	4.0	–	3.0	mmol/L
Cl–	99	–	96	mmol/L
CO_2	24	–	22	mmol/L
Blood gas (arterial)				
pH	7.289		7.259	
pCO_2	39		43	mmHg
pO_2	155		163	mmHg
BE	–8.4		–8.4	mmol/L
BEct	–8.2		–7.4	mmol/L
BP	39.5		37.8	mmol/L
HCO_3^-	17.2		18.6	mmol/L
TCO_2	18.3		19.9	mmol/L
ST HCO_3^-	17.7		17.9	mmol/L
st. pH	7.270		7.277	mmol/L
O_2 sat	98.9%		21	mmol/L

Month in the hospital

Culture	1st	2nd	3rd
Skin wound	Pseudomonas aeruginosa	Staphylococcus aureus Pseudomonas aeruginosa	Acinitobactor anitratus
Blood	Staphylococcus aureus	Staphylococcus aureus	–
Cut down wound	–	Staphylococcus aureus	–
Sputum		Staphylococcus aureus	–
Urine	–	–	Candida sp. (not C. albicans)
serologic test			
Anti-HIV	–	negative	
HBs Ag	–	negative	

Treatment in the ward

The patient was on intravenous fluid, heavy doses of antibiotics (started with penicillin G. sodium 2 million intravenously every four hours and Netromycin (300 mg) intravenously once a day for five days). Then Netromycin (same dose and route) together with Kefadin (1 gm) were used for about three weeks. Again Cifobid (1 gm) and Tienam (1 gm) every eight hours were started and continued until the time of the patient's death) and skin dressing for the burn wounds.

She was hospitalized for 92 days During her course in the hospital, the burns developed secondary infections, the cultures of which yielded Pseudomonas aeruginosa sp. in the first month, Pseudomonas aeruginosa together with Staphaureus in the second month and Acinitobacter anitratus in the latter part of the third month.

The patient also developed pneumonia and septicemia. Sputum and blood cultures (each of which were taken about 1 month apart) yielded Staphylococcus aureus. The laboratory findings corresponded with her condition, which alternatively improved or declined, respectively.

A urine culture performed about two weeks before she died yielded Candida species (but not C. albicans). At approimately the same time, her condition became poor and did not improve.

Autopsy findings (performed about two hours after her death) revealed the following;

External examination

This 20-year-old Thai woman had burns on the anterior and posterior wall of the trunk and upper extremities, with secondary infections, which caused yellowish discolorations of the wounds.

Internal examination

Scalp and skull were unremarkable. The brain, which weighed 1,250 gm, was unremarkable. The heart weighed 270 gm. There was a small amount of straw-colored fluid in the pericardial sac. The epicardium was smooth and shine and contained a small amount of fat. The right cardiac chambers, especially the right ventricle, were slightly dilated. The valvular endocardium, aortic, mitral and pulmonary, were smooth, semitransparent and elastic, and the valvular circumferences were 7 cm, 8 cm and 7 cm, respectively. The tricuspid valvular endocardium had extraordinary round vegetations; the largest one measuring 4×3 cm appeared like a ball valve. (Fig 1A, B) They were greyish-pink in color. The circumference of the tricuspid valve was 11 cm. The left ventricle measured 1.3 cm and the right ventricle measured 0.3 cm in thickness.

Figure 1. Shows gross apearance of ball valve vegetation (arrows).

Microscopic examination of the tricuspid valvular endocardium revealed vegetation containing necrotic tissue infiltrated by polymorphonuclear leukocytes an observed by normal staining. They were positive for fungi with special staining (P.A.S. and G.M.S.) Both pseudohyphal and yeast forms were present, and they were arranged parallelly in papillary fashion (Fig. 2A, B). The myocardium taken from the nearby vegetative site revealed areas of necrosis of the myocardium infiltrated by polymorphonuclear leukocytes; the areas were positive for both pseudohyphal and yeast forms of fungi with the special stains (P.A.S. and G.M.S.) (Fig. 3A, B). The myocardium part was within normal limits.

Post-mortem blood culture taken from the heart chamber yielded Candida species (but not C. albicans)

Figure 2A. Shows microscopic appearance of vegetation with necrotic tissue and scanty cellular infiltration. (H & E × 100)

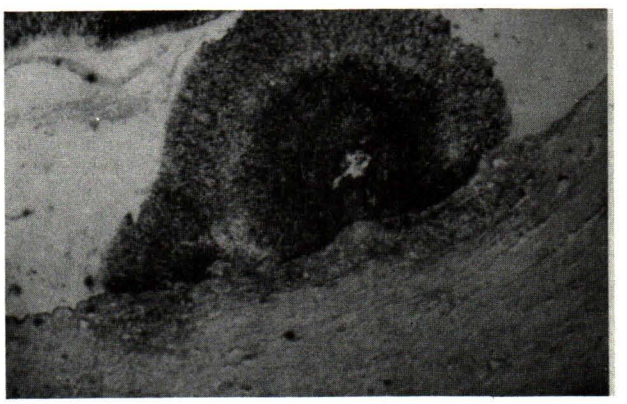

Figure 2B. Special stain shows pseudohyphal (arrow head) and yeast form (arrow). (PAS × 100)

Figure 2C. Same area. (H & E × 400)

Figure 3A. Myocardium at adjacent area shows necrosis of the myocardium and cellular infiltrations, mainly by neutrophils. (H & E × 200)

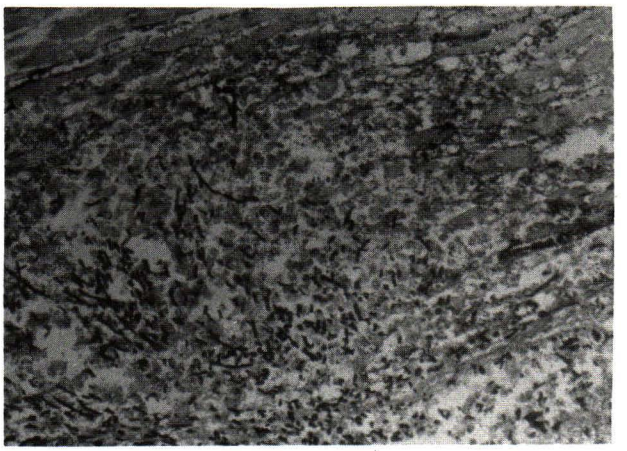

Figure 3B. Special stain from the same area shows pseudohyphal and yeast forms. (P.A.S. × 200)

Both lungs together weighed 650 gm. Microscopic examination revealed areas with protienaceous exudates with scanty cellular infiltrations, which were positive with special staining and scanty amounts of yeast form organisms in the alveoli (P.A.S. & G.M.S.)

Each of the kidneys weighed 170 and 150 gm, respectively. Microscopy revealed them to be unremarkable.

Also, the rest of the organs were unremarkable.

Discussion

Shires and Dineen[4] showed the mortality rate from sepsis in severe burn to be about 75 per cent. According to them, Manafo and Mango had advocated modern antibiotic topical therapy in the early 1960 s. This method uses 0.5% silver nitrate solution as a continuous wet soak in combination with large bulky dressings. Silver nitrate were effective against most gram-positive organisms and most Pseudomonas strains in the mid-1960s. Moncrief and Lindbergh introduced the use of Mafenide acetate (Sulfamylon cream) and Fox introduced sulfadiazine (silvadene) in the late 1960s[4]

Teplits[5] first described the decreased vascularity of burn wounds and the underlying subcutaneous tissue during the first few weeks after a burn occurs. The scanty blood supply in the wound prevents a sufficient amount of systemic antibiotic from controlling bacteria in the wound and the disruption of homeostasis associated with severe burn injury exceeds that of any other disease or injury. Mortality in the acute phase after injury is rare. However, impressive improvements in survival rates after a massive burn injury have been reported by a number of authors.[1-7] Mortality after burns of more than 40% of the body surface area (BSA) continues to be high and is attributed primarily to infection. The risk of developing infection relates directly to the extent of the burn injury. In this particular patient, the burns eftened over approxiamtely 50% of the body surface area. The burns became infected and this development was followed by staphylococcus aureus septicemia, which subsided after she received a large dose of antibiotic. But after awhile, her condition deferiorated and she expired after being hospitalized for 92 days.

The autopsy revealed tricuspid endocarditis as well as myocarditis of the adjacent myocardium by a fungal special stains (Periodic Acid Schiff and Gomori Methenamine Silver). The latter phenomenon might have occurred because the immune response to burns is very complex. It is influenced by a seies of factors such as the extent and severity of the burn, its depth, the patient's age, the presence or absence of infections, type of treatment[8-14] etc.

In uncomplicated cases, the initial response to thermal injury is a drop in the gamma globulin level, which as a rule depends on the severity and the depth of the burn.[11-14] After the initial fall in gamma globulin, the lowest level is reached within about 48 hours after the burn. This is consistent with and parallel to the fall in total protein values. Yurt and sheries[15] stated that a patient with large burns is predisposed to infection owing to depression of non-

specific, humoral and cellular immune functions. Circulating levels of immunoglobulins are inversely decreased levels of IgG have been related to mortality.[16] Increased suppression of T-cell activity has been reported by Munster and Ninnemann.[16-17] The number and function of helper T-cells are depressed, as demonstrated by Antonacci.[18] Monocyte defects have been reported by Shelby.[19] Endocarditis from Candida is characteized by large vegetative colonier usually on the mitral or aortic endocardium. In our patient however, the tricuspid valve was attacked even though there was vegetation in the forms of a hugh ball valve. The outcome of our patient was fatal, as was also decribed by Baker.[20] However, microscopically, the candida organisms were abundant in both the pseudohyphal and the yeast forms.

The species of Candida in endocarditis in this case report was not albicans which is more common, although Candida parapsilosis and Candida quillier-mondi had been reported according to Baker.

Unfortunatly in this case the clinician could not detect any signs of tricuspid insuffiency (gallop rhythm, systolic regurgitation louder with inspiration, large V wave or pulsatile liver) because these signs are presented in only one-third of the cases.[21]

Finally, in burn patients who have clinical findings associated with sepsis, a complement profile might be used to predict the severity of infection and as means of monitoring recovery as well as to predict the occurrence of a septic episode.

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