

An observational study of temperature and thermal images of surgical wounds for detecting delayed wound healing within four days after surgery

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Table 1
Participants' Demographics Data Between the Non-infected and Infected Surgical Wound Groups (N=60)

Characteristics	Infected abdominal surgical wounds n = 15		Non-infected abdominal surgical wounds n = 45		χ^2	p-value
	F	%	f	%		
Gender:						
Female	5	33.3	22	48.9	0.56	0.45 ^{NS}
Male	10	66.7	23	51.1		
Ethnicity:						
Chinese	13	86.7	40	88.9	0.74	0.69 ^{NS}
Malay	1	6.7	4	8.9		
Others	1	6.7	1	2.2		
Diagnosis:						
Carcinoma	13	86.6	42	93.4	0.83	0.66 ^{NS}
Colon						
Diverticular Disease	1	6.7	2	4.4		
Others	1	6.7	1	2.2		
Characteristics	Mean (SD)	Median (Range)	Mean (SD)	Median (Range)	Z	p-value
Age (years)	66 (9)	65 (48–81)	64 (9)	65 (47-82)	-0.46	0.64 ^{NS}
Body core temperature (°C)	36.3 (0.3)	36.4 (35.7–36.8)	36.4 (0.2)	36.4 (35.9- 37.0)	-0.26	0.79 ^{NS}
Peristomal skin temperature (°C)	34.7 (1.04)	34.5 (33.3–36.8)	35.1 (0.7)	35.4 (33.7-36.3)	-1.63	0.10 ^{NS}

Clinical Data between the Non-infected and the Infected Surgical Wound Groups (N=60)

Characteristics	Infected abdominal surgical wounds N = 15		Non- infected abdominal surgical wounds N = 45		χ^2	p-value
	F	%	f	%		
BMI category						
Underweight	2	13.3	3	6.7	0.81	0.67 ^{NS}
Normal/Pre-Obese	12	80.0	40	88.9		
Overweight	1	6.7	2	4.4		
Type of surgical procedure						
Closure of Ileostomy	11	73.3	34	75.6	0.03 ^a	1.00 ^{NS}
Closure of Colostomy	4	26.7	11	24.4		
Site of Wound						
Right Lumbar	12	80.0	31	68.9	1.77	0.78 ^{NS}
Umbilicus	0	0.0	2	4.4		
Left Lumbar	2	13.3	8	17.9		
Right Hypochondriac	0	0.0	2	4.4		
Left Hypochondriac	1	6.7	2	4.4		
Characteristics	Mean (SD)	Median (Range)	Mean (SD)	Median (Range)	Z	p-value

Abdominal Girth (cm)	85.27 (11.35)	86.00 (60–106)	86.04 (9.87)	86.00 (63–111)	-0.06	0.95 ^{NS}
Adipose tissue thickness (mm)	15.60 (6.63)	18.00 (3–24)	18.11 (7.73)	18.00 (5–34)	-0.90	0.37 ^{NS}
Length of abdominal surgical wounds (cm)	5.93 (0.65)	6.00 (5–7)	6.10 (0.94)	6.00 (5–10)	-0.43	0.67 ^{NS}

Table 2

Temperature Readings of Surgical Site Surface between the Non-infected and Infected Surgical Wounds (N = 60)

		Temperature (°C)						Z	p-value
		Non-infected		Overall Median (IQR)	Infected				
		Median	IQR		Median	IQR	Overall Median (IQR)		
Immediately	Body core temperature	36.3	35.8–37.3		36.3	35.4–37.3		-.44	.66 ^{NS}
after surgery	Highest skin surface temperature	35.1	31.6–37.1		34.9	33–36.9		-2.44	.80 ^{NS}
– Day 0	Lowest skin surface temperature	33.0	29–35.8	33.7 (33.1–34.8)	32.4	31.2–36	34.3 (33.3–35.3)	-.01	.99 ^{NS}
(N = 57)	Median skin surface temperature	33.8	30.8–36.4		33.8	32.1–36.3		-.19	.84 ^{NS}
After	Body core temperature	36.7	36–37.8		36.4	35.9–37.0		-1.21	.22 ^{NS}
surgery –	Highest skin surface temperature	36.0	32.6–38		35.5	33.8–36.6		-2.15	.03*
Day 1	Lowest skin surface temperature	34.4	31.5–36.8	35.2 (34.6–35.7)	33.4	31.3–35.8	34.6 (33.7–35.2)	-1.84	.06 ^{NS}
(N = 60)	Median skin surface temperature	35.3	32.4–37.7		34.6	32.1–36.2		-2.07	.03*
After	Body core temperature	36.5	35–38		36.6	36–37.2		-.53	.59 ^{NS}
surgery –	Highest skin surface temperature	36.1	34.3–37.5		35.8	33.9–36.4		-2.01	.04*
Day 2	Lowest skin surface temperature	34.8	32.3–36.9	35.5 (34.8–36.1)	33.9	31.9–34.9	34.8 (34.1–35.4)	-2.60	.01*
(N = 60)	Median skin surface temperature	35.5	32.6–37.2		34.9	33.2–35.6		-2.84	.01*
After	Body core temperature	36.3	36–37.4		36.2	36–37.4		-1.40	.16 ^{NS}
surgery –	Highest skin surface temperature	36.0	33.2–38		35.8	34.3–37.7		-.79	.43 ^{NS}
Day 3	Lowest skin surface temperature	35.2	31–37.4	35.7 (34.9–36.5)	34.7	32.5–36.3	35.5 (35.1–35.9)	-1.16	.24 ^{NS}
(N = 58)	Median skin surface temperature	35.7	32.2–37.6		35.3	34–36.5		-1.03	.30 ^{NS}
After	Body core temperature	36.5	36–38.9		36.4	36.1–37.8		-.11	.91 ^{NS}
surgery –	Highest skin surface temperature	36.1	33.9–38.6		35.9	33.8–37		-.58	.56 ^{NS}
Day 4	Lowest skin surface temperature	35.3	31.7–37.8	35.6 (34.8–36.6)	34.9	31.7–35.8	35.6 (34.8–36.1)	-.85	.39 ^{NS}
(n = 50)	Median skin surface temperature	35.6	32.9–38.3		35.6	33.5–36.4		-.60	.54 ^{NS}

p-value determined by Mann-Whitney U test

NS = not significant

* denotes significance on Days 2 to 4 in surgical site surface temperature between non-infected and infected surgical wounds