2021 RANZCOG Virtual Annual Scientific Meeting 15–18 February

Surgical site infection requiring hospitalisation remained unchanged with introduction of a prophylactic incisional negative pressure wound therapy guideline in a high-risk population

Sam HOLFORD, Sharon ARROL, Sarah TOUT, Charlotte OYSTON. Women's Health, Counties Manukau Health, Auckland, New Zealand.

Background

Wound problems are the leading readmission reason following open surgery at Counties Manukau Health. Prophylactic incisional negative pressure wound therapy (piNPWT) is an emerging strategy to improve wound healing and reduce surgical site infection (SSI).

The evidence for piNPWT within O&G is heterogenous and conflicting. Recently published systematic reviews obtained opposing conclusions regarding their efficacy in caesarean birth.[1-2] Subsequent studies have not identified a population for which there is a clear benefit of piNPWT.[3-5]

In November 2018, despite a lack of compelling evidence of benefit, Middlemore Hospital introduced a local guideline promoting use of the Smith & Nephew PICO NPWT dressing for SSI prophylaxis. The guideline directed its use for all women, with risk factors for SSI, undergoing caesarean birth or gynaecologic laparotomy.

Aim

To evaluate if presentations to hospital with surgical site infection, and non-infected wound problems, were reduced following introduction of a local negative pressure wound therapy guideline.

Methods

Ethics and locality approvals were obtained. The study design was before and after (introduction of a the guideline). Electronic records were reviewed by a single researcher. Costs were derived per national district health board costing standards and the hospital general ledger. Inclusion criteria: Presentations to Middlemore Hospital within 30 days of open O&G surgery 1 Jan 2018 – 31 August 2019. A washout period of Sep – Dec 2018 provided time for familiarisation with the guideline. The primary outcome was presentation to hospital with SSI within 30 days of primary surgery.

Results

Table 1. Characteristics of women who underwent caesarean birth or gynaecologic laparotomy pre- and post-implementation.

	Caesarean		Gynae laparotomy	
	Pre-	Post-	Pre-	Post-
n	1335	1453	130	133
Age (years)†	30 (26, 34)	30 (26, 34)	46 (40, 53)	47 (42, 55)
Gestation (weeks)†	39 (38, 40)	39 (38, 40)		
BMI, n (%)				
Underweight	17 (1)	16 (1)	0 (0)	1 (1)
Normal weight	377 (28)	358 (25)	17 (13)	12 (9)
Overweight	322 (24)	349 (24)	21 (16)	29 (22)
Class 1 obesity	242 (18)	285 (20)	22 (17)	29 (22)
Class 2 obesity	183 (14)	209 (14)	17 (13)	20 (15)
Class 3 obesity	187 (14)	229 (16)	19 (15)	16 (12)
Unknown	7 (1)	7 (0)	34 (26)	26 (20)
Surgery type, n (%)				
First stage	840 (63)	936 (64)		
Second stage	156 (12)	160 (11)		
Elective caesarean	339 (25)	357 (25)		
Open hysterectomy			110 (85)	118 (89)
Open myomectomy			9 (7)	2 (2)
Other laparotomy			11 (8)	13 (10)

BMI, body mass index; † Median (interquartile range)

There was a 9% increase in number of caesareans, but similar gynae laparotomy numbers. Approximately 50% of presentations involved obesity.

Run charts (Figure 1) for SSI, non-infected wound problems, and combined, showed no statistically significant change in any group, following introduction of the guideline. Despite a statistically significant increase in PICO dressing use within the department.

Total readmission costs with SSI increased post-implementation. The combined readmission costs for SSI and wound problems increased from $215,025 to $355,954, which does not include the $38,160 spent on piNPWT post-implementation. No statistically significant differences in median costs of readmission were identified.

Table 2. Post-operative hospital presentation and treatment breakdown pre- and post-implementation. Graphical representation of SSI types shown in graphic to the right.[6]

	Pre-	Post-
Presentation reason, n (%)		
Presented for any reason	181 (12)	178 (11)
SSI	73 (5)	84 (5)
Superficial	44 (3)	55 (3)
Deep	8 (1)	6 (0)
Organ space	21 (1)	23 (1)
Wound problem (non-infected)	12 (1)	11 (1)
SSI + wound problems	85 (6)	95 (6)
Treatment, n (%)		
Antibiotics given	125 (9)	125 (8)
Return to theatre	14 (1)	13 (1)
Interventional radiology	3 (0)	1 (0)

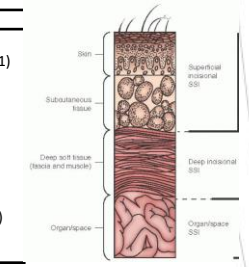
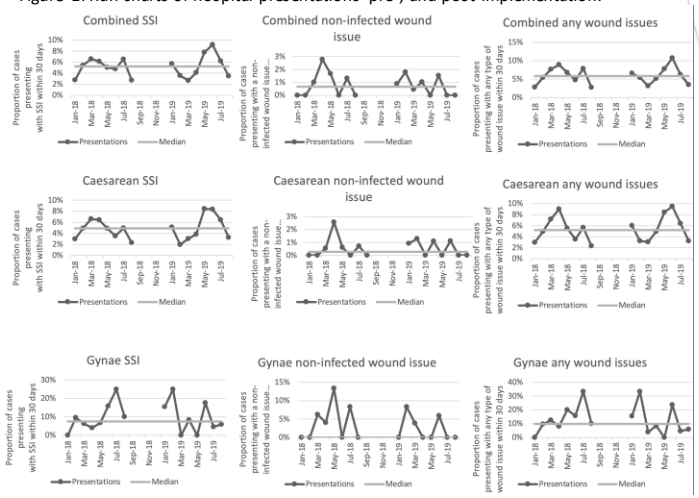


Figure 1. Run charts of hospital presentations pre-, and post-implementation.



Conclusion

Following implementation of the piNPWT guideline at our hospital,, no improvement was identified in presentations with SSI, or non-infected wound problems.

There was no evidence of a cost-benefit with use of piNPWT.

The results do not support our current implementation of piNPWT.

The largest RCT of piNPWT at caesarean (published after this study), did not find evidence of clinical benefit.[7]

When robust evidence is lacking, local outcomes should be evaluated systematically and reviewed before new treatments, such as piNPWT, become standard care.

References

1. Yu L, Kronen RJ, Simon LE, et al. Prophylactic negative-pressure wound therapy after cesarean is associated with reduced risk of surgical site infection: a systematic review and meta-analysis. Am J Obstet Gynecol. 2018;218:200-10.
2. Smid MC, Dotters-Katz SK, Grace M, et al. Prophylactic negative pressure wound therapy for obese women after cesarean delivery: a systematic review and meta-analysis. Obstet Gynecol. 2017;130:969-78.
3. Hyldig N, Vinter CA, Kruse M, et al. Prophylactic incisional negative pressure wound therapy reduces the risk of surgical site infection after caesarean section in obese women: A pragmatic randomised clinical trial. Br J Obstet Gynaecol. 2019;126:628-35.
4. Hussamy DJ, Wortman AC, McIntire DD, et al. Closed incision negative pressure therapy in morbidly obese women undergoing cesarean delivery: A randomized controlled trial. Obstet Gynecol. 2019;134:781-9.
5. Wihbey KA, Joyce EM, Spalding ZT, et al. Prophylactic negative pressure wound therapy and wound complication after cesarean delivery in women with class II or III obesity: A randomized controlled trial. Obstet Gynecol. 2018;132:377-84.
6. Horan TC, Gaynes RP, Martone WJ, et al. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Cont Hosp Ep. 1992;13:606-8.
7. Tuuli MG, Liu J, Tita AT, et al. Effect of prophylactic negative pressure wound therapy vs standard wound dressing on surgical-site infection in obese women after cesarean delivery: A randomized clinical trial. JAMA. 2020;324:1180-9.