Quality Improvement Project in Post-Laparotomy Pain and Analgesic Strategies: Results Sheet

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Background:

The quality improvement project (QIP) examined the post-laparotomy pain endured by patients, and the analgesic strategies anaesthetists at New Cross Hospital employed to minimise this feature of a major surgical procedure.

In this QIP, 32 cases were reviewed, of which 18 were emergencies and 14 were elective cases; 11 cases were further considered, but attended ITU as level 3 patients, so could not be followed up. Of these cases, 21 were female, and 11 were male. The age range spanned from 27 - 89 years-old, with an average mean age of 61.5 years-old. The length of procedure ranged from 1 hour to 20 minutes to 3 and a half hours, with the average surgical duration being 2 hours and 40 minutes.

Analgesic Strategies:

The intra-operative management was largely heterogeneous, with Fentanyl predominantly used at induction, with 3 cases utilising Remifentanyl. All patient received Morphine and Paracetamol intra-operatively. Less invariably was the prescription, and administration, of oral opioids after the analgesic strategies detailed below.

Six analgesic strategies were employed for post-laparotomy analgesia: Epidural anaesthesia, Spinal anaesthesia, Transverse Abdominis Plane (TAP) blocks, Rectus sheath catheters, skin infiltration and Patient Controlled Analgesia (PCA) only. The table below details the number of the cases each strategy was utilised:

Table 1: Analgesic Strategies Reviewed and Frequency of Cases

Analgesic Strategy	Number of Cases
Epidural Anaesthesia	2
Spinal Anaesthesia	5
TAP Blocks	8
Rectus Sheath Catheters	3
Skin Infiltration	4
Morphine PCA Only	10

Of the above strategies, the following results were deduced: Epidural anaesthesia, Spinal anaesthesia and TAP blocks provide an additional benefit compared to PCA use alone, reflected both quantitatively in the average pain score, and qualitatively in the pain descriptions (detailed the in the tables and stacked graphs below).

Table 2: Average Pain Score Associated with Analgesic Strategy:

Analgesic Strategy	Average Pain Score (0-10)		
	Recovery	After 24 Hours	After 48 Hours
Epidural Anaesthesia (Bupivacaine + fentanyl)	2	3.5	3.5
Spinal Anaesthesia (heavy Marcaine + Diamorphine)	1.6	3.2	3.2
TAP Blocks (Chirocaine)	2	3.43	3.5
Rectus Sheath Catheters (Bupivacaine + fentanyl)	2.67	3.33	8 (RSC lost)
Skin Infiltration (Chirocaine)	3.67	7	7
Morphine PCA Only	4.2	6.2	5.4

Table 3: Average PCA Morphine Use with Analgesic Strategy

Analgesic Strategy	Average Morphine Consumption (mg/24 hours)		
	Recovery	After 24 Hours	After 48 Hours
Epidural Anaesthesia (Bupivacaine + fentanyl)	No PCA Provided	No PCA Provided	No PCA Provided
Spinal Anaesthesia (heavy Marcaine + Diamorphine)	0	7.25	13.5
TAP Blocks (Chirocaine)	15	37.25	70.75
Rectus Sheath Catheters (Bupivacaine + fentanyl)	10	80	113
Skin Infiltration (Chirocaine)	23	55	42.5
Morphine PCA Only	7	48.1	41

Graphs 1: Sums of the average pain scores in recovery (left), 24 hours (middle), and 28 hours (right):

Graph 2: Average Morphine Consumption in milligrams in recovery (left), 24 hours (middle), and 28 hours (right):

Results Discussion & Summary:

The results highlight a distinct benefit in using an analgesic strategy in addition to the use of PCA, compared to the sole use of PCA alone. Notably, neuro-axial analgesia provided great benefit in the early post-operative period.

However, the QIP revealed an inherent limitation to the use of these strategies: Epidurals require care and when lost, expose the patient to a sudden non-analgesic state. Spinals, even with the addition of Diamorphine to prolong analgesia, have a limited time effectiveness due to metabolism and wearing off of the analgesic agents – the results was noted to be the same - a delayed onset of moderate to severe pain, to which the PCA (from this QIP) does not appear to adequately address. Further, neuro-axial techniques strategies are contra-indicated in the septic patient, which may be applicable in some emergency laparotomy cases.

In this regard, TAP blocks and Rectus sheath catheters provide the potential as a one shot and continuous analgesic strategy, analogous to a spinal and epidural anaesthesia, without their contra-indications. Furthermore, Rectus sheath catheters compared to epidural are in theory low maintenance and easier to care for compared to epidural catheters, and less restrictive in patient mobility. Further benefits include avoiding the side effects of neuro-axial blockade such as hypotension and urine retention. These features could facilitate 'Enhanced Recovery'. However abdominal wall blocks provide analgesia for the abdominal wall but not for the visceral contents.

TAP blocks revealed, like Epidural and Spinal anaesthesia an analgesic benefit compared to PCAs alone, however, Rectus sheath catheters did not show the same benefit. However, this could be attributed to the cases in this QIP having a catheter initially misplaced (and therefore not reflective of this technique true potential), and another with the catheter lost. As such, the results have to be interpreted with these considerations and reflects why the morphine use post-operatively was high in the Rectus sheath recipients. However, the one 'successful case' revealed very good analgesia through recovery up to 48 hours post-operatively. On this basis, a dedicated QIP examining a wider use of Rectus sheath and/or TAP catheters, may evidence an analgesic strategy that can provide continuous/prolonged analgesia, which can be employed in septic patients, with lower maintenance/less care required.

The evidence base for Rectus sheath catheters is still in its infancy, whereas the evidence base for the benefit of neuro-axial anaesthesia vs Opioid only analgesia is well established. Rectus sheath catheters are no means a new technique; however, their application has only recently been advanced with the development of small/portable ultrasound machines. In January 2014, a single-centre Randomised Control Trail 'Thoracic Epidural analgesia versus Rectus Sheath Catheters for open midline incisions in major abdominal surgery within an enhanced recovery programme (TERSC)'1 was proposed. From this, hopefully an evidence base for Rectus sheath catheters can be further developed.

In summary, the QIP evidences that multimodal analgesic strategies provide between short and intermediate term analgesia. Pain still predominates after 48 hours, hence the increase in pain scores and morphine consumption; therefore, longer term/continuous analgesic strategy is required. However, at New Cross hospital this is not always employed. We hope the QIP provides information, and basis, to compare future QIPs to study the effectiveness of other analgesic strategies, namely Rectus sheath catheters.

References

1. Kate M Wilkinson, Anton Krig, Sarah G Brearley, et al). Thoracic Epidural analgesia versus Rectus Sheath Catheters for open midline incisions in major abdominal surgery within an enhanced recovery programme (TERSC): study protocol for a randomised controlled trial. Trials201415:400. <https://doi.org/10.1186/1745-6215-15-400> © Wilkinson et al.; licensee BioMed Central Ltd. 21 October 2014