30 days after surgery, 16% (n=184/1153) of patients showed little recovery in pain-related outcomes; of these, 40% screened positively for suspect acute neuropathic pain & 73% were still taking an analgesic

Assessing Pain-Related Function & Neuropathic Pain In The Sub-Acute Surgical Phase: Findings From PAIN OUT

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BACKGROUND

In the clinical routine, patients are often told that their pain will be worst on the first post-operative day (POD) and it will start to subside by the 3rd POD. However, the literature shows that there is wide variability in how patients' pain-related outcomes resolve after surgery.
It can be fast (e.g., by 6 days) to much slower courses (e.g., by 40 days). [1]
What happens in the SUB- ACUTE phase? Between the 'acute' (roughly up to POD 3) and 'chronic' (from 3 months post-operatively) phases?
The SUB-ACUTE period may deserve attention to identify those patients who experience poor recovery and might require immediate, additional treatment. They may develop chronic post-surgical pain.

AIMS

In this study we intended to characterize pain intensity, pain-related interference and screen for acute neuropathic pain in the **ACUTE & SUB-ACUTE** phases after surgery in a large cohort of patients undergoing mixed surgical procedures.
We hypothesized that outcomes of the cohort, as a whole, would improve over time, yet, a closer look would reveal that recovery is not uniform, we will find distinct subgroups, or **CLUSTERS** of patients with differing patterns of recovery.

METHODS

This was an observational, longitudinal, cohort study. Adult patients undergoing mixed surgical procedures were evaluated in 11 tertiary hospitals in Mexico.

PAIN OUT, an international perioperative pain registry, offered the tools for the evaluating pain and treatments.

Variables – patient reported outcomes and processes

- Pain intensity and interference (function & emotions) were assessed on POD 1, 7 & 30.
  - The PAIN OUT outcomes questionnaire was used on POD1 [2] & the Brief Pain Inventory [3] on POD7 & 30 [3].
- Acute neuropathic pain was screened for on POD 1, 7 & 30 using the Douleur Neuropathique 2 (DN2), the self-filled version of the DN4 [4]; a score of ≥3/7 questions indicates suspect neuropathic pain.
- Demographics, type of surgery and perioperative treatments for pain were obtained on POD1 and analgesics on POD7 & 30.

Subgroups regarding pain severity and pain interference at POD 1, 7 & 30 were identified using k-means clustering. In addition, we a) compared the above mentioned outcomes between subgroups and b) analyzed risk factors for patients with worst outcomes.

RESULTS

The cohort included 1153 patients with complete data at the 3 times points. Patients across the cohort were 49 [35–63] years old (median and interquartile range). 67% were female. Patients underwent surgical procedures related to general surgery, orthopedics, obstetrics & gynecology, thoracic, and urology. Three clusters were identified (**see Figure 1**).

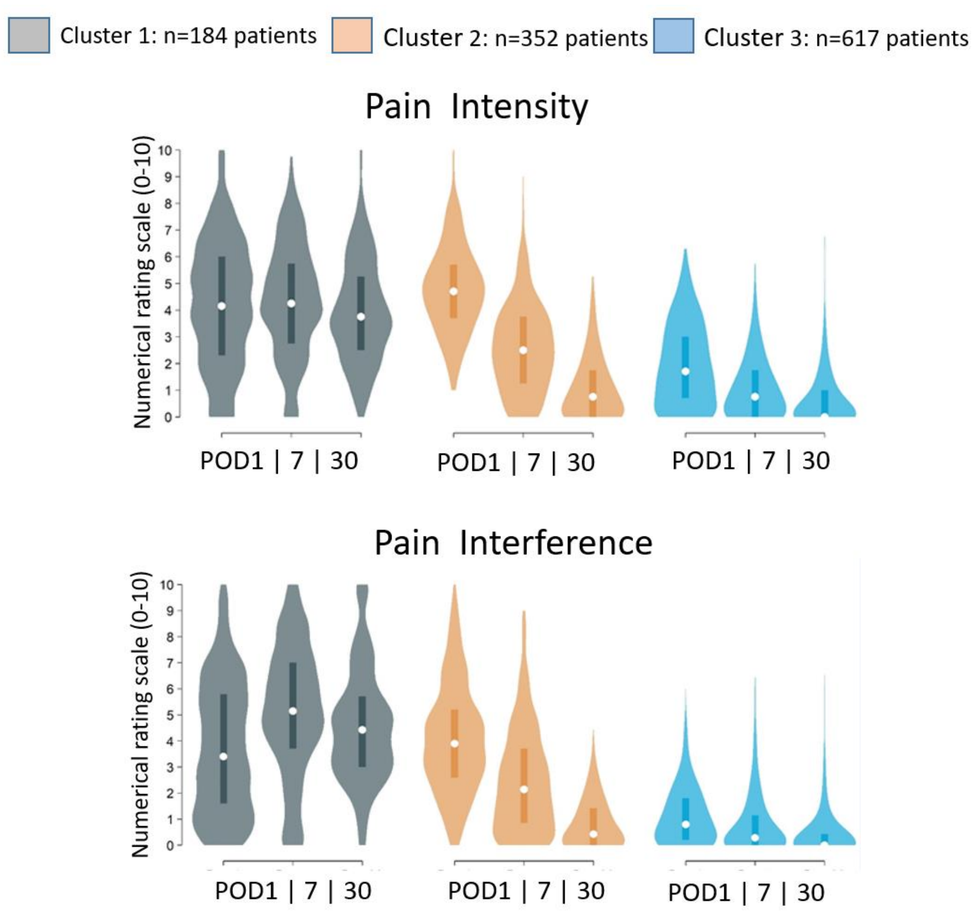

Figure 1 The white dots and bar represent the median and interquartile range. The width of the shaded area (violin plots) corresponds to the frequency of patients with similar values on the y-axis (probability density function).

Characterizing the clusters
Patients in **Cluster 1** reported relatively high levels of pain severity and interference at all-time points with little change over time.

On POD1, patients in **Cluster 2** reported similar levels of pain severity and interference as **Cluster 1.**
By POD30 the differences for pain and interference were a large effect size; for acute neuropathic pain, a small effect size. For analgesics, the differences were a medium effect size.

Cluster 3 patients reported showed relatively low levels of pain severity and interference at all three time points. Compared to **Cluster 1,** differences for pain and interference on POD1 were a medium effect size; by POD7 & POD30 they were a large effect size. By POD30, difference for medications & suspect neuropathic pain were a medium effect size.

See the QR code for TABLE 1 with detailed results.

Risks for belonging to Cluster 1
Factors associated with *increased* risk - patients on thoracic or trauma/orthopaedic wards (vs general wards), pre-existing chronic pain, longer duration of surgery, and the combination of regional and general anaesthesia (*vs* general anaesthesia alone) were associated with a higher risk (all $p < 0.05$).
Factors associated with *decreased* risk - Male patients, patients on urological wards, receiving an opioid preoperatively and intraoperative non-opioid treatment were associated with a lower risk (all $p < 0.05$).

CONCLUSIONS

We evaluated a large cohort of patients undergoing mixed surgical procedures. When outcomes were assessed across the entire cohort, all pain-related outcomes improved by POD30 (not shown here). However, when the cohort was viewed as 3 clusters, results were more nuanced. Most patients' pain-related variables resolved by POD30, but patients in one cluster showed little signs of recovery. These patients should be identified while still in the sub-acute phase to prevent further suffering, deterioration of function and possible progression to chronic post-surgical pain.

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Take a picture for names of authors & Table 1