

The Challenge of Pain Relief for Burn Survivors

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In the night on June 27, all anesthesiologists rushed to the ER to do endo intubation, central venous catheter, and artery line for victims.

The general perception of an anesthetist is to administer surgical anesthesia inside operating room. In reality, a great deal of our work happens outside the operating room, especially in life-threatening situations. When Green Nine (emergency) is announced, we anesthetists would rush to the scene and begin resuscitation, emergency treatment, and intubation. On June 27, 2016, the eve of the Formosa Fun Coast dust explosion, we were there at ER to assist intubation and the insertion of central venous and artery catheter. Stabilizing patient vital signs is another specialty of the anesthetist. Our

training requires us to have an intricate knowledge of internal and external diseases and organ systems, as well as the use of all acute and chronic pain relievers. In the incident of the waterpark dust explosion, pain physicians were heavily involved in the pain management of all burn patients.

Burnt Fingers Prohibit Self-Administering Pain Relief

Shortly after the explosion, under the order of Taipei Tzu Chi Hospital Supt. Chao You-Chen and the Department of Anesthesiology Dir. Huang Chun-



During the operation for a seriously burn patient, even the anesthesiologist and many other staff would assist to hold the leg high for hours.

Jen, we assembled an anesthetic and pain management team, focusing on pain relieving for the patients in the treatment to come. The first thought was the installation of patient-controlled analgesia that allows patients to self-regulate the dosage of morphine. Upon further investigation, out of the 13 patients, 12 of them suffered severe burns to the finger, making it impossible to operate the pressure switch. To effectively relieve the intense, excruciating pain from burn injury, it was up to the nurses to regulate the flow rate of the infusion pumps, continuing the administration of venous morphine.

The addiction to morphine soon became the concerns of the family when morphine analgesia is the only effective pain reliever during debridement, grafting, and dressing of large body surface burn, and the medical staff had exercise caution when facing the risk of morphine tolerance and dependence. Under the professional control and monitoring of the medical team and the pain physicians, we successfully alleviated pain and avoided tolerance and dependence of morphine analgesia.

Accurate Venous and Artery Catheterization and Pain Relief

Aside from administering anesthesia during debridement and skin grafting, the

anesthesia team is also responsible for the insertion and replacement of central venous and artery catheters, since the burn patients with severe damage to the skins have no usable peripheral blood vessels. Thanks to the solid training, we completed each catheter insertion with ultrasound guidance. Another role we fulfill is the venous anesthesia and pain management inside ICU during a comprehensive wound dressing. It was done to minimize any psychological scars these patients may suffer from the extreme pain during wound dressing. The pain management team of Taipei Tzu Chi Hospital accomplished greatness in this regard.

An Intricate Balance of Effective Pain Relief and Morphine Dependency

As the treatment extended into week two, the subacute phase, the threat of death gradually subsided. What a pain physician has to think about is the prevention of tolerance and dependence of morphine analgesia from large dosage administration. Tolerance refers to the increase in dosage of morphine analgesia to achieve the same effect as before; dependence refers to the euphoria of rapid pain relief from venous morphine injection that could lead to dependence. In treatment, we rotate the venous morphine analgesia used

to avoid tolerance from large dosage. Once the patients could ingest oral medication, we immediately switched to oral morphine, which could minimize the euphoria, and hence dependence, from injection. During the initial stage of burn treatment, we administered medication to treat neuropathic and chronic pain via nasal catheters, successfully managed the patients' pain to a scale of 0 to 3 from the original 10, without the administration of large doses of morphine analgesia.

As a pain physician trained in the department of anesthesia, with years of experience with morphine analgesia, and knowing full well the correct administration and management of controlled substances will not lead to addiction, whenever I thought about the fact that 13 young lives were using venous morphine analgesia 24 hours non-stop, it kept me at night. Morphine and heroin are both schedule 1 drugs, after all, I could never erase my guilt if any one of these young people develop dependency. Fortunately before the end of second week, most of the patients changed to oral morphine, and I was relieved.

We Are Here, Pain Is Not

From week two to week four, debridement and skin grafting had

completed, and we were finally in the recovery stage. In this stage, non-morphine analgesics, combined with a small dose of oral morphine, can reach a desirable pain relief. One month into treatment, except for two or three patients who required morphine after surgery or wound dressing, most were off any sort of morphine analgesics. As they continue to recover from the merciless fire, the joy and the thrill of watching these patients relieved from pain without developing morphine dependency was incredibly satisfying.

With the growing skin comes the pain from rehabilitation and scar contracture, and the chronic pain that might develop later. At the time of the injury, the skin, together with the nerves underneath, receive severe damage. Once nerves are damaged, neuropathic pain such as extreme itching, prickling, tingling, and burning, or hyperalgesia and paresthesia, can develop during recovery, which in time may progress into chronic pain. Fortunately, we started using neuromodulators, like the new calcium channel blocker Lyrica, in the early stages of the treatment, which could drastically reduce the pain and itch during recovery and prevent or reduce the development of chronic pain.

I had felt, while caring for these children, their trust and dependence on the anesthetic and pain management

team. I recalled a patient, overwhelmed by a sudden pain at 1am, immediately called an anesthetist, as it was the first thought to cross his mind; another patient always requested an anesthetist during wound dressing, for simply by having an anesthetist around, even without the administration of analgesics, is sufficient to relieve his overwhelming anxiety and pain. Our

intervention throughout the treatment had brought them a strong sense of security. As tired as we were, I was glad that he relied on us, not morphine. Watching these young patients discharged one by one under the care and effort of Taipei Tzu Chi Hospital, it was the best reward we could ask for. We hope that every single one of them can soon return to their life.



When a burn patient got his/her skin back gradually, the task of the anesthesiologist would be to lower his/her chronic pain during recovery.