1) Pattern of illness and novel treatments

Having spent a week with a consultant in oculoplastics on my Ophthalmology rotation at the Royal London, and a month at the Bascom Palmer, I have reached the general conclusion that the disease patterns and presentations are quite similar. As many of the procedures are to correct a functional problem – a ptosis repair for example – there can be a huge cosmetic aspect to the underlying reason for the procedure. In Miami, for example, there are far more private, independent patients who pay for blepharoplasties and eyelid correctional surgery, even if it is not affecting their vision. The difference in London is that I did not see any cosmetic patients at all, most probably because I was not observing private practice! In terms of technology, my impression is that the Bascom Palmer has access to the most cutting edge technology I have ever seen. For instance, one day, I walked in and all the staff in the operating room were wearing 3D glasses. A company from Japan, KestrelView, were promoting 3D ophthalmic surgery, and this experience for me was fantastic – something I had never seen in the U.K.

2) Pattern of health provision

I felt that the clinics and theatres in Miami were very well organised. As this is the only private hospital I have spent time in, it is difficult for me to generalise this to all hospitals in the USA. Clinics are conducted by the staff in a very systematic manner, similar to the UK. The nurses dilate and work up the patients, conducting visual field and acuity testing. Following this, the patient is then reviewed first by the resident/trainee, then seen again by the attending/consultant. This method is highly effective and thorough. The big difference I notice is the time the attending spends with the patient. In Miami it was minimal compared to London – most probably because all the basic investigations have all been carried out. Theatre staff are very organised, and cancellations or delays are known about and dealt with well in advance – this is not something I have observed in London during my time as a medical student. The surgeons at the Bascom Palmer waste no time between surgeries, and as a result they are done with all cases by the early afternoon. In addition, residents have protected theatre days, where they are just observed by the consultant performing various surgeries on patients. The emphasis on teaching junior staff is similar, as Ophthalmology itself is a specialty with a heavy focus on medical education.

3) Health related objective

Observing around four clinics a week, and three theatre sessions, I became familiar with the process and focused history taking skills required in Oculoplastics. I encountered many diseases including blepharitis, ptosis, benign and malignant masses, styes and dry eye. In addition, surgical procedures I encountered included blepharoplasty, ptosis repair (conj-mullerectomy and levator approaches), orbitectomy, drainage and excisions. I also was able to appreciate the intricate nature of cosmetic procedures such as Botox, and various fillers.

4) Research project- Literature review

Local anaesthetic injection has been highlighted in the literature as the most painful aspect of minor procedures.[1, 2] A recent paper stipulated that our perception of injury and pain is mediated by cutaneous nociceptors.[3] Cutaneous nociceptors are comprised of pressure sensitive Ruffini endings, mechanoreceptors and free-ended nociceptors at the dermal-epidermal border.[3, 4] During the sharp sensation upon local anaesthetic needle penetration, fast

myelinated fibres (A-δ fibres) carry afferent impulses. Pain is not only experienced during needle penetration, but also during infiltration of the anaesthetic. Pacinician corpuscles, mechanoreceptors and Ruffini endings are activated by needle puncture and this is the pain and discomfort patients experience as the most uncomfortable part of surgery.[1, 2] Endorphin release during noxious stimuli is also a key factor in pain perception, especially in relation to needle penetration.

Endorphins exist as endogenous opioid polypeptide compounds and they are released by the hypothalamus and pituitary gland in response to pain, exercise, stress and orgasm.[5] They can be likened to exogenous opioids due to their analgesic properties. Four types of endorphin exist: alpha; beta; gamma and sigma.[6] During noxious stimuli, for example, pain, the primary type and most abundant is β-endorphin. The latter interacts with opioid receptors, specifically the μ_1-opioid receptor. Thereafter, the release of the inhibitory neurotransmitter GABA is inhibited, which activates an increase in dopamine.[7, 8]This dopamine release helps analgesia, as well as the feeling of euphoria often associated with opioids. One study reported an increase in plasma β-endorphin and cortisol levels in patients who had undergone blunt trauma – thus very high levels of pain. [9]

Several studies have investigated pain perception upon needle penetration of local anaesthetic, but they have been primarily in the dental field.[10, 11, 12] These studies which utilised visual analog scales to grade pain, measured various variables which are deemed to affect pain perception. These include site of injection, size of needle and volume of injection.[13] However it is reported that the gauge of needles has little effect on perception of pain upon penetration.[14, 15] Evidence does state that penetrations with the same needle can induce more pain, as a sharper needle activates less of the aforementioned nerve endings.[16, 17] Interestingly, a study comparing changing needles during multiple buccal local anaesthetic injections at different sites found that the first injection from a pair of identical injections was the most painful.[18] From this research, another study randomised the administration of fresh and used needles, and although no huge differences were found, there was a gender difference in pain perception.[10] Women were in greater discomfort upon penetration of a used needle in a different site to the initial first needle penetration. Meechan et al suggested that conditioning to the pain after first penetration could also occur, but data from Martin et al pointed out that subjects felt more pain during the second intra oral injection.[10, 18] This demonstrates the huge subjectivity of pain perception and the relatively superficial understanding we have about it.

Literature states that more consideration is required in relation to patients' perception of pain, pressure and discomfort produced by the local anaesthetic injection itself. More research is required into better techniques for local anaesthesia infiltration. [12] Our study aims to inform the gap in the literature about techniques of repeated needle penetration periorbitally during blepharoplasties, as well as the timings of administration.

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