Techniques to limit intravascular injection.

1. Know your injection anatomy – avoid danger areas and depths.

2. Aspiration before injection in higher risk areas. This is not a guarantee of extravascular location as false negatives are high. Nonetheless, it is still the authors' recommendation, especially in higher risk areas.

3. Slow injections with the least amount of pressure (definitely advantageous). Adverse events will commonly occur when the injector is rushing to complete a treatment.

4. Move the tip of the needle slightly with delivery of the product. Although theoretically this will limit the amount of possible embolic material, it is controversial as the tip can move in or move out of a vessel.

5. Incremental injections of 0.1-0.2 cm^3 of product. Severe adverse events have been associated with a significant deposition of product.

6. Small syringe to deliver precise aliquots. The amount of product deposited over time is a significant factor in embolic events.

7. Small needles to slow the injection speed. This is controversial in that the higher gauge can conversely access the smaller diameter vessels inaccessible to larger bore needles.

8. Blunt flexible microcannulas. Intravascular transgression is still possible and has been reported. A cavalier approach is not warranted.

9. Addition of a small amount of vasoconstrictor in the product or as a preparatory step may effect some vasoconstriction without the long lasting block nor blanching of the skin.

10. Patient selection (e.g. previous surgery with scarred beds portends an increased risk of a vascular event).

11. The injector should always observe the skin at the area of injection and not the syringe in his/her hand, just as a driver watches the road and not the steering wheel. Drivers have rear view mirrors into which they glance to prevent accidents - so too does the injector whose rear view mirror is the glabellar region. Glabellar blanching can be the first indication of intravascular injection in the face regardless of the injection location. Therefore occasional glancing into the 'rear view mirror' of the glabellar region for signs of blanching, regardless of the site of facial injection, is advisable.

12. The occurrence of patient pain distant to the site of injection, in spite of lidocaine with the commercially available products. (N.B. This is not noted in every case)

13. The possibility of delayed onset (several hours later) of symptoms and signs that require emergent care.