Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

[18] American Burn Association. National Burn Repository 2005 Report: Dataset Version 2.0. Chicago: American Burn Association; 2006.
[19] American Burn Association. National Burn Repository 2007 Report: Dataset Version 4.0. Chicago: American Burn Association; 2008.
[20] American Burn Association. National Burn Repository: Report of data from 1999–2008 (Dataset Version 5.0). Chicago: American Burn Association; 2009.
[21] American Burn Association. National Burn Repository: Report of data from 2000–2009 (Dataset Version 6.0). Chicago: American Burn Association; 2010.
[22] American Burn Association. National Burn Repository: Report of data from 2002–2011 (Dataset Version 8.0). Chicago: American Burn Association; 2012.
[23] American Burn Association. National Burn Repository: Report of data from 2003–2012 (Dataset Version 9.0). Chicago: American Burn Association; 2013.
[24] American Burn Association. National Burn Repository: Report of data from 2004–2013 (Dataset Version 10.0). Chicago: American Burn Association; 2014.
[25] American Burn Association. National Burn Repository: Report of data from 2005–2014 (Dataset Version 11.0). Chicago: American Burn Association; 2014.
[26] American Burn Association. National Burn Repository: Report of data from 2006–2015 (Dataset Version 12.0). Chicago: American Burn Association; 2016.
[27] American Burn Association. National Burn Repository 2019 Update: Report of data from 2009–2018 (Dataset Version 14.0). Chicago: American Burn Association; 2019.

David L. Neil Ph.D.
Dr. Word Ltd., 7F-11, No. 57, Sec. 1, Chongqing S. Rd., Taipei 10045, Taiwan

E-mail address: dr.word.ltd@outlook.com (D. Neil).

http://dx.doi.org/10.1016/j.burns.2020.04.044

Safety of powered dermatome during the COVID-19 pandemic

The COVID-19 pandemic has necessitated health services in all parts of the world to change practice at unprecedented speed, with frequent changes in guidance as new evidence emerges

Despite the overwhelming focus on mitigating the effects of COVID-19 on the population at all levels, many aspects of life continue along with their associated risks. Whilst seeing a reduction in direct review of burn patients, our unit has still seen a number of major burns that have required skin grafting during the pandemic.

The WHO [1] and Public Health England [2] have produced guidance on aerosol generating procedures (AGP) and BAPRAS has produced guidance for PPE use in plastic surgical procedures [3], but there is currently no guidance specifically related to the risks associated with the use of powered dermatomes. Although this is a very specific concern, it does warrant investigation in the context of the ongoing pandemic and requirement to risk assess each operation. We were unable to find any published information on the use of powered dermatomes as an AGP and the subject has been particular concern for burn surgeons.

There has been specific guidance for high-power tools used in orthopaedic surgery [4], and as the pneumatic and electric Zimmer ® dermatomes operates at 4500–6500 oscillations per minute (manf. product information [5]), it would class as a high-power tool and therefore likely to generate aerosol.

Current UK government [2] and WHO guidance [1] consider safe distancing to be at least 1m, and ideally 2m. This is evidently not possible during surgery and as such current guidance from BAPRAS [3] and the Royal Colleges [6] recommends the use of full PPE including visors and FFP3 masks for most surgical procedures for all staff within 2m of the patient. Individual trusts have developed their own guidance for PPE usage, which is particularly important to reduce misuse of equipment in short supply.

The risk of COVID-19 transmission from non-respiratory tract bodily fluids is not fully understood and the virus has been found in blood [7,8]. We set out to establish if blood is aerosolised during harvest of skin grafts, and therefore what forms of PPE should be recommended.

1. Method

In a standard operating theatre with non-laminar air flow, we set up a trolley with our standard model for teaching skin graft harvest, a silicone gel pressure mat with multiple layers of 3M Microfoam™ tape to simulate the harvest site.

Distances of 1m and 2ms were marked out on the floor, with absorbent incontinence pads set up on the floor and from drip stands at the 2m boundary Image 1).

The primary and assistant operator was gowned with the same absorbent sheets.

Using saline stained with carmoisine (red dye commonly used to make clear skin prep visible) as lubricant on the simulated skin surface and in the dermatome's path during graft harvest, a pneumatic Zimmer ® dermatome was used to take multiple “grafts” from the model (Image 2). Following the harvest simulation, the primary operator, assistant and floor were visually assessed for droplet spatter.

The primary operator had evidence of significant droplet spray below the umbilical level, and to the hands as would be

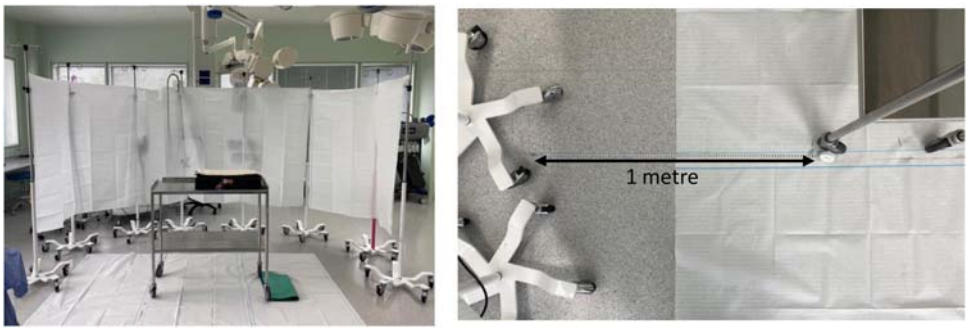

Image 1 – Table and model set up in theatre (left). Distances of 1m and 2m were marked out on the floor (right).

Image 2 – Zimmer® dermatome used to take multiple grafts from the model.

expected with the assistant showing significantly less spatter. There was evidence of significant droplet fallout to the floor up to 1m, but nothing beyond 1m (Image 3).

This assessment is evidently limited to macroscopic large droplets, which we are aware behave in a different manner to aerosolised droplets.

2. Discussion

Within the limitations of the methodology, we have shown that whilst harvesting skin grafts with a pneumatic dermatome, there is significant risk of droplet contamination to the operators and the immediate environment of the patient.

The relatively higher risk for transmission of blood-borne viruses such as hepatitis viruses and HIV whilst using high-power tools is already established, and the possibility of COVID-19 transmission via blood has been discussed in recent publications by the Asia Pacific Blood Network [9] and Chang et al. [10].

As such, until the risk of COVID-19 transmission from non-respiratory droplets has been fully established, and in light of a small number of reported cases of blood borne transmission, we would suggest it is reasonable to use full high-risk PPE when harvesting skin grafts and that the number of people within 1 metre of the harvest site is kept to the absolute minimum, ideally a single surgeon where possible. Similar suggestions have been forwarded for orthopaedic procedures by Hirschmann et al. [11].

Prior to the emergence of COVID-19, Tellier et al. opened the discussion about PPE recommendations, and how they are arrived at [12], concluding that until there are multiple studies in multiple modalities, it is not possible to refine PPE recommendations. In particular, they recommended that in cases where a pathogen may be *anisotropic*, i.e. have potential multiple routes of transmission, even if one route accounts for a small number of cases, steps should be taken to interrupt that route.

Given that there has been a reported case of blood borne transmission [13] of COVID-19 and there is otherwise a lack of evidence to the contrary as noted by Mohseni et al. [14], it should be assumed that there is a risk of transmission via aerosolised blood associated with the use of powered dermatomes. A number of these authors have specifically addressed the lack of evidence [10–14] in their reasoning for their recommendations and conclusions, and we would agree with this reasoning.

Image 3 – The primary operator had evidence of significant droplet spray below the umbilical level (left), with fallout to the floor within 1 metre (right, red arrow marking furthest visible droplet).

From our own observations during this study and during actual operations, it was noted that many surgeons are in the habit of leaning towards the dermatome during graft harvest, increasing their risk of droplet contamination of the face. We recommend the operating surgeon maintains the maximum distance possible whilst maintaining adequate control of the equipment, i.e. standing upright and not leaning in towards the field.

We also advocate the use of water based lubricating jelly rather that saline as its increased viscosity should reduce spatter, and the use of clear draping material between the harvest site and the operators to reduce upward movement of any droplets or aerosol that is not visible.

3. Conclusion

The rapid emergence of COVID-19 and resulting shifts in day-to-day practice have generated considerable challenges for health care services around the world, and huge volumes of new evidence are being generated on a daily basis. As yet there is no definitive answer as to whether or not the virus can indeed be transmitted via blood or other non-respiratory bodily fluids, so we would recommend that PPE should be used in accordance with local guidance for high-risk AGPs. We recognise the financial and resource burden this may present, but the current evidence base does not warrant taking lesser precautions, or increasing personal risk to burns surgeons.

Conflict of interest

None to declare.

Funding

None.

Acknowledgments

We thank our colleagues Miss Parvathi Varma and Miss Vi Vien Toh for their assistance with producing this work.

REFERENCES

[1] WHO. Infection prevention and control during health care when COVID-19 is suspected 2020vol. 1:. p. 1–5 Available from: https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125.

[2] PHE. COVID-19 personal protective equipment (PPE) [Internet]. 2020 Available from: https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/covid-19-personal-protective-equipment-ppe#summary-of-ppe-recommendations-for-health-and-social-care-workers [cited 27.05.20].

[3] BAPRAS. BAPRAS guideline interpretation – reducing COVID-19 transmission risk and PPE guidance for plastic surgeons [Internet]. . p. 1 Available from: http://www.bapras.org.uk/docs/default-source/covid-19-docs/ppe-guidance-for-plastic-surgeons—bapras-branding.pdf?sfvrsn=2 [cited 26.05.20].
[4] Simpson AHRW, Dall G, Haas JG. COVID-19 – potential transmission through aerosols in surgical procedures and blood products. Bone Jt Res 2020;9(4):200–1.
[5] Zimmer™ air dermatome instruction manual [Internet]. Available from: http://service.zimmer.com/Content/uploads/06001810406—Air-Dermatome-430.pdf [cited 25.05.20].
[6] ASGBI, RCS, RCSEd, RCSI. Updated general surgery guidance on COVID-19. . p. 1–13 Available from: https://www.rcseng.ac.uk/coronavirus/joint-guidance-for-surgeons-v2/.
[7] Chen W, Lan Y, Yuan X, Deng X, Li Y, Cai X, et al. Detectable 2019-nCoV viral RNA in blood is a strong indicator for the further clinical severity. Emer Microb Infect 2020.
[8] Tingbo L. Handbook of COVID-19 prevention and treatment. 2020.
[9] Coronavirus N. APBN rapid brief white paper 2020. . p. 1–18 Available from: https://apbnonline.com/images/apbn rapid brief white paper.novel coronavirus sars-cov-2.pdf.
[10] Chang L, Yan Y, Wang L. Coronavirus disease 2019: coronaviruses and blood safety. Transfus Med Rev [Internet] 2020;34(2)75–80 Available from: https://doi.org/10.1016/j.tmrv.2020.02.003.
[11] Hirschmann MT, Hart A, Henckel J, Sadoghi P, Seil R, Mouton C. COVID-19 coronavirus: recommended personal protective equipment for the orthopaedic and trauma surgeon. Knee Surg Sport Traumatol Arthrosc [Internet] 2020;28(6) 1690–8 Available from: https://doi.org/10.1007/s00167-020-0602.2-4.
[12] Tellier R, Li Y, Cowling BJ, Tang JW. Recognition of aerosol transmission of infectious agents: a commentary. BMC Infect Dis 2019;19(1):1–9.
[13] Cho HJ, Koo JW, Roh SK, Kim YK, Suh JS, Moon JH, et al. COVID-19 transmission and blood transfusion: a case report. J Infect Public Health [Internet] 2020;(November)2019–20 Available from: https://doi.org/10.1016/j.jiph.2020.05.001.
[14] Mohseni AH, Taghinezhad-S S, Xu Z, Fu ZX. Body fluids may contribute to human-to-human transmission of severe acute respiratory syndrome coronavirus 2: evidence and practical experience. Chinese Med (United Kingdom) [Internet] 2020;15(1)7–10 Available from: https://doi.org/10.1186/s13020-020-0033.7-7.

Timothy Michael Noblet*
Sharmila Jivan
Mohammad Umair Anwar
Department of Plastic Surgery and Burns, Pinderfields Hospital, Mid Yorkshire NHS Trust, United Kingdom

* *Corresponding author at*: Gate 29, Burns Unit, Pinderfields General Hospital, Aberford Road, Wakefield, West Yorkshire WF1 4DG, United Kingdom.
E-mail addresses: TMNoblet@doctors.org.uk, timothynoblet@nhs.net (T. Noblet).

http://dx.doi.org/10.1016/j.burns.2020.07.012

Increased admissions and hospitalizations to pediatric burn center during COVID 19 pandemic

Dear Editor,

Since the COVID-19 epidemic begin, our personal and professional lives significantly have altered [1]. During last 4 months, majority of children under 18 yrs-old population were under “stay at home” orders in Turkey.

The admission and hospitalization to our pediatric burn center are averages 600 and 350, respectively, per year with peak during the winter.

We have reviewed our burn workload between March 11 and June 11, 2020 during the period of COVID-19 pandemic and compared it to data of admissions and hospitalization from the same period of the previous years. We found the significant increasing in pediatric burn admissions and hospitalization by 52% and 60%, respectively. The average TBSA burned in hospitalized children increased dramatically from 49% TBSA burned during same period of previous years to 66% BSA burned during pandemic period. Also, it is not surprise for us the significant increasing rate of all kinds of burn injuries in children of all ages since “stay at home” orders. We have expected this rise and took our necessary precautions.

In conclusion, all kind of trauma except burns in children decreased during the first three months of pandemic and the increased admissions and hospitalizations of pediatric burns is going on, therefore all burn care staffs must be ready this situation with taking high preventive measures against COVID-19 [1,2].

Conflict of interest

The author has no conflict of interest.

REFERENCES

[1] Williams FN, Nazimani R, Chrisco L, King BT. Increased burn center admissions during COVID 19 pandemic. J Burn Care Res 2020 https://academic.oup.com/jbcr/article-abstract/doi/10.1093/jbcr/iraa112/5865765 [in press].