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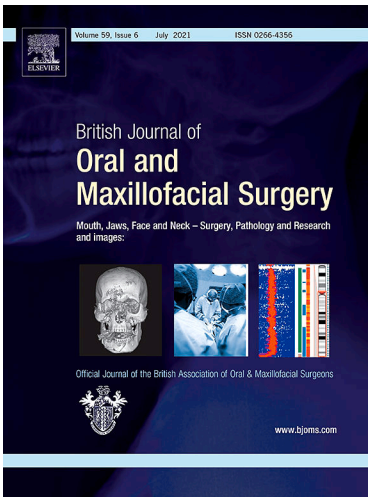

Immediate post-operative care on high dependency unit or ward following microvascular free tissue transfer: lessons learnt from a change in practice imposed during the Covid 19 pandemic

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Immediate post-operative care on high dependency unit or ward following microvascular free tissue transfer: lessons learnt from a change in practice imposed during the COVID-19 pandemic

Abstract

The COVID-19 pandemic resulted in sudden changes to the established practice of using high dependency (HDU) for the first night of postoperative care following microvascular free tissue transfer. Patients were managed instead on the head and neck ward. This retrospective case-note review aimed to report outcomes in consecutive patients treated before and during the pandemic and to reflect on the implications of ward-based care rather than HDU.

235 patients had free tissue transfer between 3rd January 2019 and 25th February 2021, 125 before the pandemic (lockdown 23rd March 2020), and 110 during the pandemic (52 ward managed and 58 HDU managed). There were subtle case-mix differences during the pandemic, with 92% of ward treated patients having oral cancers compared with 64% of HDU patients and 73% of ward patients having a tracheostomy compared with 40% of HDU patients. Ward patients were less likely to receive electrolyte replacement (45% HDU Vs 0% Ward) and inotropes (12% HDU Vs 2% Ward). There were fewer returns to theatre for evacuation of haematoma or re-anastomosis during the pandemic than before. Other than fewer haematoma complications occurring during the pandemic the nature of complications was similar. In conclusion, the dramatic changes imposed by the pandemic have shown the ward to be a safe place for patients to be cared for immediately post-operatively and this alleviates bed pressures experienced in HDU. Careful case selection and clear criteria are required to identify patients needing HDU.

Introduction

In England on the 23rd March 2020 'lockdown' occurred due to the COVID-19 pandemic. There was huge disruption to head and neck oncology services.[1] A national survey of Oral and Maxillofacial surgeons on early effects of the pandemic on head and neck oncology and microvascular reconstruction practice reported that 8% were requested to pause head and

neck cancer (HNC) surgery, 24% to pause free flap surgery, while 55% agreed that head and neck and reconstructive surgery should continue.[2] Jeannon reported their units continued provision of complex HNC surgery during the pandemic, focused on a two-month period and comprising only 13 patients with microvascular free tissue transfer who were highly selected as low-risk candidates.[3] In our Unit, the pandemic caused difficulties accessing theatres but contingencies allowed for cancer ablative surgery and free flap reconstruction to continue. The main difference during the pandemic was having to manage patients on the ward immediately post-operatively due to unavailability of high dependency unit beds (HDU). Interestingly Zaid reported that most surgeons (92%) kept their patients in an intensive care unit (ICU) environment, whereas only 8% transferred them to a specialized step-down unit.[2]

Abbreviation defined

In our Unit, the standard practice is for first night post-operative patients to be managed on HDU. To continue with microvascular reconstruction, it was necessary to use ward-based staff to manage patients on the head and neck ward. There was one to one nursing for the first night on the ward. For suitable patients, immediate transfer to an intermediate-level unit or ward with speciality-trained nursing staff is appropriate.[4] Making a change in established practice is problematic and the experience gained during the pandemic can be instructive. For a small proportion of patients, the pandemic will have made a difference in intention to treat and type of treatment, but these were relatively few and difficult to clarify. Hence the aim of this retrospective case note review is to report the impact of managing patients on the ward rather than HDU in respect to case-mix factors, use of tracheostomy, complications and management in the first 48 hours, reason for acute medical assessment, and peri-operative death.

Methods

A consecutive cohort of patients, without exclusions, having microvascular free tissue transfer surgery from January 2019 to February 2021 was derived from existing MDT lists and ATMIS theatre logs. During the pandemic, the choice between ward and HDU management was driven by access to HDU. Scrutiny of scanned notes (EDMS) enabled appropriate data to be recorded for subsequent analysis and included patient age, gender, tumour site and clinical staging, ACE27 and WHO status, free-flap details, tracheostomy, days on HDU, length of surgery and details of post-operative complications, medical emergency calls, returns to theatre, and Clavien-Dindo grading of complications.[5]

Fisher's exact test compared categorical data between patient groups before and during the pandemic and between HDU and ward management groups during the pandemic. The Mann-Whitney test compared duration of operation between the same groups. Three patients had two operations before the pandemic and 3 patients an operation before and during the pandemic; for these 6 patients, the statistical independence of their data could not be assumed so the latest operation was selected for analysis. Statistical significance was regarded as $p<0.05$. Analyses were performed using SPSS version 25 and Stata version 13. Where percentages are stated in the results section without numerator and denominator then the numerator and denominator are readily available within tables.

This study was approved by Liverpool University Hospital NHS Foundation Trust Audit Department (CAMS registration number 9936)

Results

The 235 patients had free tissue transfer between 3rd January 2019 and 25th February 2021, 125 before lockdown (23 March 2020) and 110 afterwards. Before the pandemic, 125 patients were managed in the immediate post-operative period on the HDU while during the pandemic it was a mix of 58 HDU and 52 ward, a total of 183 HDU and 52 ward.

Patient case-mix and surgical details are given in Table 1. During the pandemic, there were fewer composite free-flap operations performed than beforehand (42% pre Vs 30% during), in particular fewer radial composite flaps (11% pre Vs 1% during). Operation times were 28

minutes shorter on average (504 pre Vs 476 during, p=0.046). WHO status was graded less severely in patients treated during the pandemic (p=0.043) with 82% (during) Vs 67% (pre) being fully active, able to carry on all pre-disease performance without restriction. For the 110 patients treated in the pandemic, there was little difference observed in case-mix or operation details by whether they were managed in the HDU (n=58) or ward (n=52), apart from tumour site (p<0.001) where 92% of ward patients had oral cavity tumours compared with 64% of HDU patients.

Other aspects of postoperative management and outcome are summarised in Table 2, while details of postoperative complications are shown in Table 3. Within 48 hours of surgery more patients during the pandemic received standard treatment (fluids, regular medications, analgesia, anti-emetics) than before (52% pre Vs 62% during); regarding non-standard treatment, there were no transfusions done during the pandemic compared with 8% before (p=0.002). There were clear differences (p<0.001) regarding tracheostomy and overnight intubation; the tracheostomy rate was similar (62% pre Vs 55% during), while the overnight intubation rate halved (24% pre Vs 11% during) and the percentage without either increased (14% pre Vs 34% during). There were fewer returns to theatre (26% pre Vs 15% during, p=0.04) and notably fewer returns for evacuation of a haematoma (11% pre Vs 2% during, p=0.004) and re-anastomosis (9% pre Vs 3% during, p=0.06). The percentage with Clavien-Dindo complications ≥ grade III was slightly lower (27% pre Vs 17% during, p=0.09). There was little difference in having medical emergency calls (11% pre Vs 8% during) nor in having any postoperative complications (58% pre Vs 55% during). Other than there being fewer haematoma complications during the pandemic (7% pre, 1% during) the distributions of complications appeared similar. The complications rate for patients having tracheostomy was 62% (48/78) before and 59% (36/61) during the pandemic; this compared to 50% (15/30) and 58% (7/12) respectively for patients having overnight intubation and 47% (8/17) and 46% (17/37) for those having neither. For the 110 patients having surgery during the pandemic, there was little difference observed between HDU (n=58) and ward (n=52) managed patients apart from tracheostomy/overnight intubation and initial treatment within the first 48 hours (both p<0.001). Whereas 21% of HDU managed patients during the pandemic had overnight intubation, there were none administered for ward managed patients; 40% of HDU patients and 73% of ward patients had a tracheostomy. Ward patients were more likely to receive standard treatment in the first 48 hours (43% HDU Vs 83% Ward); the

main differences in non-standard treatment were for electrolyte replacement (45% HDU Vs 0% Ward, p<0.001) and in the use of inotropes (12% HDU Vs 2% ward, p=0.06).

During the pandemic 56% (33/59) of patients whose operation started (knife to skin time) between 9:30-10:29 am were ward managed, compared to 40% (16/40) starting 10:30-10:59 am and 27% (3/11) starting after 11:00 am, p=0.11. Regarding operation finishes, 73% (16/22) ending before 5pm were ward managed, compared with 45% (10/22) ending 5:00-5:59 pm, 38% (16/42) ending 6:00-7:59 pm and 42% (10/24) after ≥8pm, p=0.06. There were no obvious trends regarding the day of surgery (results not shown).

Use of abbreviation avoided

Throughout the study, there were 3 peri-operative deaths, 2 of these in the pre-pandemic HDU group (one 25 days after surgery from complications of hospital-acquired pneumonia and one 22 days after surgery from complications of aspiration pneumonia). The third patient was in the HDU group during the pandemic and died 21 days after surgery from a cardiac arrest.

Discussion

Although outcomes following HNC ablation and free tissue transfer are remarkably good even in older patients[6], controversy remains regarding the optimal place to care for patients immediately following free tissue transfer.[4] More intensive management on HDU over the first night might reduce early acute complications such as hypotension or airway difficulties, and allow for better pain control particularly for donor sites such as the DCIA free flap. Optimal care could be a factor in reducing flap compromise. However, HDU is a relatively costly and valuable resource with limited bed availability. Operations can be delayed whilst waiting for bed confirmation and occasionally are cancelled if none is available. It is possible to get additional ward staff at short notice to allow patients to be managed on the ward but this adds to work burden as unplanned overtime for existing staff. Our established practice is to use HDU; however, the pandemic forced a change and created an opportunity for transfer to the head and neck ward after a few hours in the post-operative recovery area in the theatre complex. Ward staff have no specific HDU training and there was a degree of trepidation around patient safety in making this change.

Though this was a large number of consecutive free flaps over two years, there are several limitations. The ward experience was from a single institution and might not be

representative of ward environments elsewhere. The Unit has experience of 'specialising' patients on the ward when a HDU bed is not available. In addition, given the number of free flaps performed annually the ward staff have considerable experience of early post-operative care as typically all patients return to the ward environment from HDU by early afternoon the day after their operation. Also, additional support is given by the consultant anaesthetist in charge of the case who see these patients on the ward both before and after the operation. This is augmented by the HDU outreach team, who not only are available if the patient vital signs deteriorate but also there for advice as part of the ward rounds. Understandably, this experience may not be able to be replicated elsewhere.

Relatively few patients went to the ward and although random allocation was not involved, it is a relative strength of this study that the decision to use the ward was based solely on HDU availability. Patient case-mix will have been affected at the height of the pandemic with fewer referrals and due to NHS constraints perhaps fewer were offered free flap reconstruction; however, the purpose of this study was not to comment on selection for free tissue transfer. The possible effect of dual consultant operating on outcomes is hard to account for and while infrequent pre-COVID it became standard practice during the peak of the pandemic and this has continued.

The study findings suggest subtle changes in case-mix over the timeframe, for example relatively more oral cancers being ward managed during the pandemic. However, with the ability to provide cancer ablation and free tissue transfer throughout the pandemic, the ward and HDU patients were comparable in age, stage, comorbidity and flap type. Case selection was influenced more by decision to treat rather than post-operative ward care.

Although the literature suggests an average length of stay on HDU of 2-3 days[7,8], our patients typically stay just one night post-operatively. Most patients developing post-operative medical complications do so several days later and it would be reasonable to postulate that staying less than 24 hours in HDU should not impact on this. Also, surgical complications such as haematomas and flap salvage might not have different outcomes whether in ICU or ward. Our data suggests that the ward environment can address most post-operative medical issues. This is set in the context of first-tier dentally qualified on-call juniors, supported by ward nurses and second-tier dual-qualified surgical trainees. Experienced ward staff might be better at detecting early flap compromise which is key to successful salvage.[9] There was a

difference in management noted for electrolyte replacement and inotropes. Most likely there is a more 'intensive' care plan on HDU but the data suggests for most cases this was not an essential aspect of post-operative management. The head and neck anaesthetists managed the cases similarly in the theatre recovery suite, whether going to HDU or returning to the ward.

Interestingly the pandemic brought into focus the use of temporary tracheostomy. The Unit had a low threshold to perform tracheostomies to secure the airway in the early postoperative period[10] accepting the negative impact on patients' experience.[11] There was a gradual reduction in tracheostomies with increasing avoidance of tracheostomy altogether or overnight intubation. However, as there was a perceived increased risk of airway compromise for ward managed patients, more tracheostomies were performed there during the pandemic, a trend now being reversed through careful case selection. Another change in practice, two-consultant operations, was done mainly to shorten operative time; operating time was 43 minutes shorter for ward patients but the difference was not significant. The start and finish times were earlier for ward patients, reflecting greater certainly of a post-operative bed and no delays whilst awaiting confirmation of HDU bed availability. Informal feedback from trainees suggested that twin consultant operating enhanced rather than detracted from their theatre experience. Small numbers prevent any meaningful comment on how dual-consultant operating might affect return to theatre for events such as evacuation of haematoma or re-anastomosis

The pandemic allowed reflection on possible future changes to postoperative care and also demonstrated the close collaboration, communication and teamwork between the ward and the intensive care outreach team. To continue ward management in this immediate post-operative recovery phase, there is a need to develop and evaluate the selection criteria for who is managed on the HDU and ward, standard operating procedures on the ward in terms of patient care escalation to the outreach team, and enhanced training for ward-based staff. It would be helpful to include a cost analysis and patient experience as these would strengthen a business case.

In conclusion, the COVID-19 pandemic forced a change in the post-operative practice which with refinement, could lead to quality improvement. The data suggests that ward management is a safe and efficient use of resources.

Acknowledgement

Anaesthetic and ward staff for their dedication, resilience and professionalism throughout the pandemic.

Conflict of Interest

We have no conflicts of interest.

Ethics Statement / Confirmation of Patient's Permission

The data was collected for service evaluation and approved by the local Clinical Governance Department. Patient permission not required, anonymised data

DOI added to all references

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Table 1 Patient case-mix and operation details

		Pre-pandemic (n=125)		During pandemic (n=110)		P value	During pandemic HDU (n=58)		During pandemic ward (n=52)		P value
		Operations	%	Operations	%		Operations	%	Operations	%	
Age	<55	16	13	26	24	0.16	15	26	11	21	0.56
	55-64	26	21	24	22		10	17	14	27	
	65-74	54	43	39	35		20	34	19	37	
	≥75	29	23	21	19		13	22	8	15	
Gender	Male	71	57	69	63	0.42	38	66	31	60	0.56
	Female	54	43	41	37		20	34	21	40	
Stage (overall)	Early	24	19	29	26	0.070	13	22	16	31	0.13
	Advanced	83	66	64	58		33	57	31	60	
	ORN	15	12	8	7		4	7	4	8	
	Other*	3	2	9	8		8	14	1	2	
T stage	0-1	12	11	14	15	0.42	6	13	8	17	0.72
	2	27	25	26	28		11	24	15	32	
	3	8	7	11	12		6	13	5	11	
	4	60	56	42	45		23	50	19	40	
N stage	2-3	26	24	29	31	0.33	15	33	14	30	0.91
	1	21	20	12	13		5	11	7	15	
	0	60	56	52	56		26	57	26	55	
Site	Oral Cavity	101	81	85	77	0.77	37	64	48	92	<0.001
	Oropharynx	11	9	10	9		7	12	3	6	
	Other*	13	10	15	14		14	24	1	2	
Flap type	Composite	52	42	33	30	0.077	18	31	15	29	0.84
	soft	73	58	77	70		40	69	37	71	
Flap type	DCIA	3	2	2	2	0.012	2	3	0	0	0.55
	Fibula	23	18	19	17		12	21	7	13	
	Radial comp	14	11	1	1		0	0	1	2	
	Scapula	12	10	11	10		4	7	7	13	
	ALT	26	21	30	27		17	29	13	25	
	Lat Dorsi	2	2	0	0		0	0	0	0	
	MSAP	2	2	0	0		0	0	0	0	
	Radial soft	43	34	45	41		22	38	23	44	
	Rectus ab	0	0	2	2		1	2	1	2	
Length of operation Quartiles (minutes)	≤422 min	29	23	33	30		13	22	20	38	
	423-495	30	24	27	25		18	31	9	17	
	496-571	33	26	28	25		16	28	12	23	
	≥572	33	26	22	20		11	19	11	21	
	Median(IQR)	504 (427-578)		476 (403-557)		0.046	490 (424-556)		447 (377-558)		0.20
ACE27	0	87	70	76	69	0.98	41	71	35	67	0.83
	1	28	22	26	24		14	24	12	23	
	2	9	7	7	6		3	5	4	8	

T and N stage added to Table 1

	3	1	1	1	1		0	0	1	2	
WHO status	0	84	67	90	82	0.043	45	78	45	87	0.39
	1	26	21	15	14		9	16	6	12	
	2	12	10	3	3		3	5	0	0	
	3-4	3	2	2	2		1	2	1	2	

Overall Stage: Early (T1N0M0, T2N0M0); The 12 others were Adenoid cystic, Ameloblastoma (3), Clear-cell SCC, Cutaneous SCC, Extensive BCC, Malignant melanoma, Recurrent BCC (3) Skin SCC.
Site: The 28 others were Antrum (5), Columella (2) Larynx (1), Left neck (1), Left pinna (1), Left posterior ethmoid (1), Lip (2), Nasal cavity (6), Orbit (2), Pinna/Parotid (1), Post-auricular (2), Right parotid (2), Scalp (1), Skin of cheek/parotid (1). TN staging excludes ORN/Others

P value: Fishers exact test apart from Mann-Whitney for length of operation

Table 2 Post-operative management and outcome

		Pre-pandemic (n=125)		During pandemic (n=110)		P value	During pandemic HDU (n=58)		During pandemic ward (n=52)		P value
		Operations	%	Operations	%		Operations	%	Operations	%	
Treatment In first 48 hours**	Standard treatment*	65	52	68	62	0.15	25	43	43	83	<0.001
	Non-standard treatment:										
	Inotropes	16	13	8	7	0.20	7	12	1	2	0.06
	Electrolyte Replacement	25	20	26	24	0.53	26	45	0	0	<0.001
	Steroids	1	1	3	3	0.34	2	3	1	2	>0.99
	Haemostatic agents	1	1	0	0	>0.99	0	0	0	0	-
	Transfused	10	8	0	0	0.002	0	0	0	0	-
	Other	16	13	13	12	0.85	6	10	7	13	0.77
Tracheostomy	Yes	78	62	61	55	<0.001	23	40	38	73	<0.001
	No	17	14	37	34		23	40	14	27	
	Overnight intubation	30	24	12	11		12	21	0	0	
Days on HDU	1	99	79	50	86	0.63	50	86	-	-	N/A
	2	18	14	5	9		5	9	-	-	
	3-4	5	4	1	2		1	2	-	-	
	5-12	3	2	2	3		2	3	-	-	
Post-op complication	Yes	72	58	60	55	0.69	34	59	26	50	0.44
	No	53	42	50	45		24	41	26	50	
MET call	Multiple	0	0	2	2	0.12	1	2	1	2	0.72
	One	14	11	7	6		5	9	2	4	
	None	111	89	101	92		52	90	49	94	
Return to Theatre	Yes	33	26	16	15	0.04	11	19	5	10	0.19
	No	92	74	94	85		47	81	47	90	
Reason for return to theatre **	Haematoma evacuation	14	11	2	2	0.004	1	2	1	2	>0.99
	Re-anastomosis	11	9	3	3	0.06	2	3	1	2	>0.99
	Airway	7	6	5	5	0.77	4	7	1	2	0.37
	Debulking/debridement of flap	4	3	1	1	0.38	1	2	0	0	>0.99
	Drainage and washout of wound	1	1	1	1	>0.99	1	2	0	0	>0.99
	New free-flap	3	2	3	3	>0.99	2	3	1	2	>0.99
	Other	5	4	4	4	>0.99	1	2	3	6	0.34
Clavien-Dindo Grade	0	42	34	50	45	0.32	23	40	27	52	0.22
	I	17	14	15	14		10	17	5	10	
	II	32	26	26	24		13	22	13	25	
	IIIA	1	1	0	0		0	0	0	0	
	IIIB	28	22	16	15		11	19	5	10	
	IVA	1	1	2	2		0	0	2	4	
	IVB	0	0	0	0		0	0	0	0	
	V	4	3	1	1		1	2	0	0	

*Of fluids, regular medication, analgesia, anti-emetics

**Multiples were possible

P value: Fishers exact test

Table 3 Main Post-operative complications

		Pre-pandemic (n=125)		During pandemic (n=110)		P value	During pandemic HDU (n=58)		During pandemic ward (n=52)		P value
		Operations	%	Operations	%		Operations	%	Operations	%	
Main post-op complication was	Surgical	46	37	26	24	0.06	15	26	11	21	0.67
	Medical	26	21	34	31		19	33	15	29	
	None	53	42	50	45		24	41	26	50	
Main complication: Surgical	Bleed from surgical site	2	2	1	1	0.55	1	2	0	0	0.84
	Chyle leak	2	2	1	1		1	2	0	0	
	Flap failure	4	3	3	3		2	3	1	2	
	Haematoma	9	7	1	1		1	2	0	0	
	Seroma	2	2	4	4		2	3	2	4	
	Problem with tracheostomy	5	4	1	1		1	2	0	0	
	Vascular compromise	4	3	4	4		3	5	1	2	
	Wound dehiscence	7	6	4	4		1	2	3	6	
	Wound infection	10	8	6	5		3	5	3	6	
	Other	1	1	1	1		0	0	1	2	
Main complication: Medical	Cardiovascular	3	2	8	7	0.47	5	9	3	6	0.91
	Gastrointestinal	0	0	1	1		1	2	0	0	
	Multiple organ failure	0	0	1	1		0	0	1	2	
	Need for transfusion	4	3	2	2		1	2	1	2	
	Renal	2	2	1	1		1	2	0	0	
	Respiratory	17	14	21	19		11	19	10	19	

P value: Fishers exact test

Table 1 Patient case-mix and operation details

		Pre-pandemic (n=125)		During pandemic (n=110)		P value	During pandemic HDU (n=58)		During pandemic ward (n=52)		P value
		Operations	%	Operations	%		Operations	%	Operations	%	
Age	<55	16	13	26	24	0.16	15	26	11	21	0.56
	55-64	26	21	24	22		10	17	14	27	
	65-74	54	43	39	35		20	34	19	37	
	≥75	29	23	21	19		13	22	8	15	
Gender	Male	71	57	69	63	0.42	38	66	31	60	0.56
	Female	54	43	41	37		20	34	21	40	
Stage (overall)	Early	24	19	29	26	0.070	13	22	16	31	0.13

	Advanced	83	66	64	58		33	57	31	60	
	ORN	15	12	8	7		4	7	4	8	
	Other*	3	2	9	8		8	14	1	2	
T stage	0-1	12	11	14	15	0.42	6	13	8	17	0.72
	2	27	25	26	28		11	24	15	32	
	3	8	7	11	12		6	13	5	11	
	4	60	56	42	45		23	50	19	40	
N stage	2-3	26	24	29	31	0.33	15	33	14	30	0.91
	1	21	20	12	13		5	11	7	15	
	0	60	56	52	56		26	57	26	55	
Site	Oral Cavity	101	81	85	77	0.77	37	64	48	92	<0.001
	Oropharynx	11	9	10	9		7	12	3	6	
	Other*	13	10	15	14		14	24	1	2	
Flap type	Composite	52	42	33	30	0.077	18	31	15	29	0.84
	soft	73	58	77	70		40	69	37	71	
Flap type	DCIA	3	2	2	2	0.012	2	3	0	0	0.55
	Fibula	23	18	19	17		12	21	7	13	
	Radial comp	14	11	1	1		0	0	1	2	
	Scapula	12	10	11	10		4	7	7	13	
	ALT	26	21	30	27		17	29	13	25	
	Lat Dorsi	2	2	0	0		0	0	0	0	
	MSAP	2	2	0	0		0	0	0	0	
	Radial soft	43	34	45	41		22	38	23	44	
	Rectus ab	0	0	2	2		1	2	1	2	
Length of	≤422 min	29	23	33	30		13	22	20	38	
operation	423-495	30	24	27	25		18	31	9	17	
Quartiles	496-571	33	26	28	25		16	28	12	23	
(minutes)	≥572	33	26	22	20		11	19	11	21	
	Median(IQR)	504 (427-578)		476 (403-557)		0.046	490 (424-556)		447 (377-558)		0.20
ACE27	0	87	70	76	69	0.98	41	71	35	67	0.83
	1	28	22	26	24		14	24	12	23	
	2	9	7	7	6		3	5	4	8	
	3	1	1	1	1		0	0	1	2	
WHO status	0	84	67	90	82	0.043	45	78	45	87	0.39
	1	26	21	15	14		9	16	6	12	
	2	12	10	3	3		3	5	0	0	
	3-4	3	2	2	2		1	2	1	2	

Overall Stage: Early (T1N0M0, T2N0M0); The 12 others were Adenoid cystic, Ameloblastoma (3), Clear-cell SCC, Cutaneous SCC, Extensive BCC, Malignant melanoma, Recurrent BCC (3) Skin SCC.
Site: The 28 others were Antrum (5), Columella (2) Larynx (1), Left neck (1), Left pinna (1), Left posterior ethmoid (1), Lip (2), Nasal cavity (6), Orbit (2), Pinna/Parotid (1), Post-auricular (2), Right parotid (2), Scalp (1), Skin of cheek/parotid (1). TN staging excludes ORN/Others

P value: Fishers exact test apart from Mann-Whitney for length of operation

Table 2 Post-operative management and outcome

		Pre-pandemic (n=125)		During pandemic (n=110)		P value	During pandemic HDU (n=58)		During pandemic ward (n=52)		P value
		Operations	%	Operations	%		Operations	%	Operations	%	
Treatment In first 48 hours**	Standard treatment*	65	52	68	62	0.15	25	43	43	83	<0.001
	Non-standard treatment:										
	Inotropes	16	13	8	7	0.20	7	12	1	2	0.06
	Electrolyte Replacement	25	20	26	24	0.53	26	45	0	0	<0.001
	Steroids	1	1	3	3	0.34	2	3	1	2	>0.99
	Haemostatic agents	1	1	0	0	>0.99	0	0	0	0	-
	Transfused	10	8	0	0	0.002	0	0	0	0	-

	Other	16	13	13	12	0.85	6	10	7	13	0.77
Tracheostomy	Yes	78	62	61	55	<0.001	23	40	38	73	<0.001
	No	17	14	37	34		23	40	14	27	
	Overnight intubation	30	24	12	11		12	21	0	0	
Days on HDU	1	99	79	50	86	0.63	50	86	-	-	N/A
	2	18	14	5	9		5	9	-	-	
	3-4	5	4	1	2		1	2	-	-	
	5-12	3	2	2	3		2	3	-	-	
Post-op	Yes	72	58	60	55	0.69	34	59	26	50	0.44
complication	No	53	42	50	45		24	41	26	50	
MET call	Multiple	0	0	2	2	0.12	1	2	1	2	0.72
	One	14	11	7	6		5	9	2	4	
	None	111	89	101	92		52	90	49	94	
Return to	Yes	33	26	16	15	0.04	11	19	5	10	0.19
Theatre	No	92	74	94	85		47	81	47	90	
Reason for	Haematoma evacuation	14	11	2	2	0.004	1	2	1	2	>0.99
return to	Re-anastomosis	11	9	3	3	0.06	2	3	1	2	>0.99
theatre **	Airway	7	6	5	5	0.77	4	7	1	2	0.37
	Debulking/debridement of flap	4	3	1	1	0.38	1	2	0	0	>0.99
	Drainage and washout of wound	1	1	1	1	>0.99	1	2	0	0	>0.99
	New free-flap	3	2	3	3	>0.99	2	3	1	2	>0.99
	Other	5	4	4	4	>0.99	1	2	3	6	0.34
Clavien-Dindo	0	42	34	50	45	0.32	23	40	27	52	0.22
Grade	I	17	14	15	14		10	17	5	10	
	II	32	26	26	24		13	22	13	25	
	IIIA	1	1	0	0		0	0	0	0	
	IIIB	28	22	16	15		11	19	5	10	
	IVA	1	1	2	2		0	0	2	4	
	IVB	0	0	0	0		0	0	0	0	
	V	4	3	1	1		1	2	0	0	

*Of fluids, regular medication, analgesia, anti-emetics

**Multiples were possible

P value: Fishers exact test

Table 3 Main Post-operative complications

		Pre-pandemic (n=125)		During pandemic (n=110)		P value	During pandemic HDU (n=58)		During pandemic ward (n=52)		P value
		Operations	%	Operations	%		Operations	%	Operations	%	
Main post-op complication was	Surgical	46	37	26	24	0.06	15	26	11	21	0.67
	Medical	26	21	34	31		19	33	15	29	
	None	53	42	50	45		24	41	26	50	
Main complication: Surgical	Bleed from surgical site	2	2	1	1	0.55	1	2	0	0	0.84
	Chyle leak	2	2	1	1		1	2	0	0	
	Flap failure	4	3	3	3		2	3	1	2	
	Haematoma	9	7	1	1		1	2	0	0	

	Seroma	2	2	4	4		2	3	2	4	
	Problem with tracheostomy	5	4	1	1		1	2	0	0	
	Vascular compromise	4	3	4	4		3	5	1	2	
	Wound dehiscence	7	6	4	4		1	2	3	6	
	Wound infection	10	8	6	5		3	5	3	6	
	Other	1	1	1	1		0	0	1	2	
Main complication:	Cardiovascular	3	2	8	7	0.47	5	9	3	6	0.91
Medical	Gastrointestinal	0	0	1	1		1	2	0	0	
	Multiple organ failure	0	0	1	1		0	0	1	2	
	Need for transfusion	4	3	2	2		1	2	1	2	
	Renal	2	2	1	1		1	2	0	0	
	Respiratory	17	14	21	19		11	19	10	19	

P value: Fishers exact test

Immediate post-operative care on high dependency unit or ward following microvascular free tissue transfer: lessons learnt from a change in practice imposed during the Covid 19 pandemic

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