British Association of Dermatologists National Audit Skin Cancer Excision 2016 in collaboration with the

Daniel Keith | David de Berker | Adam Bray | Andrew Brain | M. Firouz Mohd Mustapa

We conducted a re-audit of the surgical practice of United Kingdom (UK) dermatologists in the treatment of non-melanoma skin cancer and examined changes with reference to our previous audit in 2014. The audit was supplemented by a detailed assessment of completeness of the histopathology reports for each tumour submitted. This latter was undertaken by colleagues in the Royal College of Pathologists.

Methods

UK dermatologists and histopathologists collected data on ten consecutive non-micrographic excisions for basal cell carcinoma and five for squamous cell carcinoma. Data was collected on site, pre-operative diagnosis, histological diagnosis, proximity to previous scars, histological deep and peripheral margins. Histopathology reports were assessed on completion of dataset items and free text or structured reporting.

Results

We received 222 responses from 135 centres of 3290 excisions. Excisions from the head and neck accounted for 56.7% of cases. The mean tumour diameter was 11.4 mm (SD 7.1 mm, maximum 100 mm) and 97% of cases were primary excisions. BCCs accounted for 65.7% of total cases and SCCs 26.8%. Of the suspected BCCs, 95.8% were confirmed histologically and for suspected SCCs 80.4%. Similar proportions of BCC and SCC cases were within 10 mm of a previous excision. All margins for any tumour were clear in 97.0%. Reported surgical complication rate in the audit was <1%. Of the 2864 histology reports evaluated only 706 (24.6%) contained all core dataset items. 95% of these were synoptic reports. The most commonly omitted data items were level of invasion, risk and T stage. They were absent in 35.7%, 64.2% and 44.1% of reports, respectively.

Conclusions

The audited data suggests a high level of complete excision and low level of complications. Most patients were not followed up in secondary care hence complication rates may be under-reported. Histopathology reporting has a much greater chance of being complete if reports are generated on a field based platform (synoptic reporting).

Background

Non-melanoma skin cancer (NMSC) including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) are common cancers affecting large numbers of the population. Diagnosis and management of skin cancer represents a large part of Dermatology workload. Excision surgery is the most common form of treatment for skin cancer (NICE IOG 2006).[1] Complete excision is a required standard for definitive treatment with excision surgery.[2-4]

We conducted an audit of data provided by 222 dermatology consultants, associate specialists and registrars practising in the UK in order to assess the excision of non-melanoma skin cancer. A previous audit conducted in 2014 acted as a benchmark to compare and chart progress.

Histopathology reporting of skin cancer is a factor in the collection of data centrally on the incidence and characteristics of the disease. Where histopathology reporting is undertaken in a consistent methodical fashion aligned with datasets used in the national cancer registry, central data collation is automated and makes complete collection possible. Where histopathology reporting is undertaken in a manner that does not match the datasets of the national cancer registry, manual entry is required. Current resources do not support that and consequently, the data is not fully recorded. The dataset is designed to collect clinically relevant information enabling high quality practice; completeness supports patient care.

Methods

A surgical audit log spreadsheet was circulated to British Association of Dermatologists (BAD) and British Society for Dermatological Surgery (BSDS) members in the United Kingdom via email (Table 1).

Members were asked to collect, prospectively (where possible), data for 10 consecutive non-Mohs excisions of suspected BCC and 5 of suspected SCC. This was carried out from January to May 2016. Data collection included details to provide context and define case-mix. Variables included pre-surgery diagnosis, proximity to previous skin cancer, risk factors for bleeding and infection, presence of pacemaker or implantable defibrillator, tumour diameter, type of excision, clinical margin taken, type of closure, histological diagnosis, deep and lateral margins, and complications.

Submitted data was amalgamated. Statistical analysis was conducted in R v3.1.3 (©2015 The R Foundation for Statistical Computing, Vienna Austria). Heatmaps were created using Openheatmap (www.openheatmap.com).

This project was undertaken in collaboration with the Royal College of Pathologists. Data from the histopathology reports was analysed separately by a working group in the Royal College of Pathologists. Each report was assessed for completion of fields of the Core Data Items (CDI) of the National Minimum Datasets (NMDS) as well as the characteristics of each tumour. Reports were designated structured (i.e. synoptic reporting) or 'free text'.

Tumours were broken down by nine body sites: cheek or chin; ear (or within 2 cm); genitalia, perineum or perianal; hand or foot; nose (or within 1 cm) or lips; other limb; periocular, temple, forehead or eyebrow; scalp or neck; trunk.

Pre-operative clinical and post-operative histological diagnoses were compared for percentage agreement. For those lesions where the pre- and post-operative diagnoses disagreed, the histological diagnosis was taken as definitive. The reported maximum tumour diameter was calculated and plotted on a density distribution. Types of excision were recorded: excision and re-excision. We examined the complication rate of re-excision vs. excision, and the proportion of re-excision performed at different body sites.

Tumours recorded to be within 10 mm of a previous scar were classified as possible recurrent lesions. Histological deep and peripheral margins were examined for completeness of excision.

Results

A total of 222 responses were received (164 consultants, 21

on Non-Melanoma
Royal College of Pathologists

Table 1. Data collection fields

Is this prospective data collection? Yes / No
Pre-op diagnosis (clinical) Basal Cell Carcinoma (BCC) Squamous Cell Carcinoma (SCC)
Is this area within 10 mm of a previous treatment scar? Yes / No
Bleeding risk
Infection risk
Cardiac device
Other risk
Largest tumour diameter (mm)
Body site Cheek or chin Ear (or within 2 cm) Genitalia, perineum or perianal Hand or foot Nose (or within 1 cm) or lips Other limb Periocular, temple, forehead or eyebrow Scalp or neck Trunk
Type of excision done Primary Re-excision
Clinical margin
Closure
Histological diagnosis Actinic keratosis BCC SCC Bowen's disease Melanoma Benign Other
Clear deep margin Involved < 1 mm 1 – 5 mm > 5 mm
Clear lateral margin Involved < 1 mm 1 – 5 mm > 5 mm
Complications Yes / No
Was the patient seen / reviewed after surgery? Yes / No

Table showing the data collection fields in a spreadsheet circulated to members of the British Association of Dermatologists (BAD) and British Society of Dermatological Surgeons in the UK.

registrars and 37 other specialist grades) at 135 identifiable centres. 3290 patient procedures were recorded. The spread of participants from different regions in the UK is shown in Figure 1 and Figure 2.

Figure 1. Heatmap of UK responses by region

This heatmap of the UK shows the spread of responses providing data for the audit. The total number was 222 (including three from Northern Ireland or Eire, and one from the Channel Islands not shown here) responses from 135 centres. Value represents intensity of activity reported by colour indicated and is a continuous scale not a key.

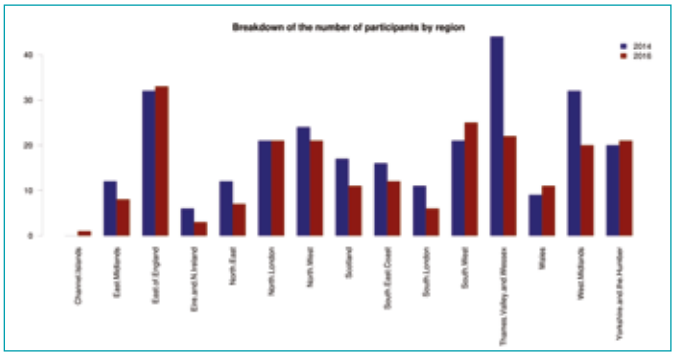

Figure 2. Bar plot of UK responses by region
Region by region submissions compared to data from 2014 audit.

Of all submitted data, 44.8% was collected prospectively compared to 58.4% in 2014.

Excision sites

A total of 3269 episodes recorded information about excision site. The procedures were carried out most commonly on the head and neck 56.7% (58.3% in 2014) totalling 1853, reflecting the propensity for skin cancer to affect sun-exposed sites (Figure 4).

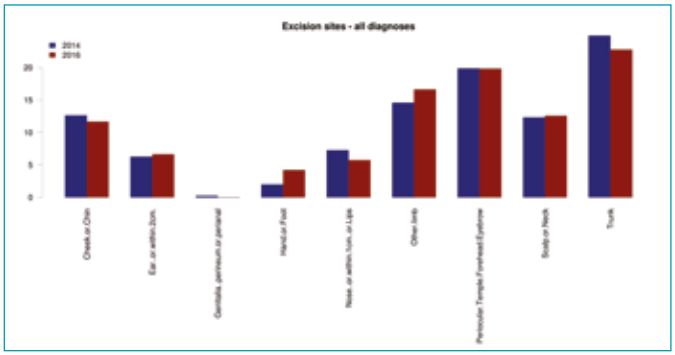

Figure 4. Bar plot of excisions by body site
Percentages of excisions by body site compared to data from 2014 audit.

Pre- / Post-operative diagnosis

Approximately 2/3 of the 3290 procedures were carried out for BCC (67.4% suspected, 65.7% histological diagnosis) and 1/3 for SCC (32.6% suspected, 26.8% histological diagnosis) as would

be expected from the data collection method. Table 2 shows the percentage agreement between pre- and post-operative diagnoses. Overall, for BCC there was 95.8% (94.4% in 2014) agreement, SCC 80.4% (66.8% in 2014) agreement.

Table 2. Pre-operative vs Histological diagnosis agreement.

Type	No of cases	% Agreement
BCC	2109 / 2201	95.8
SCC	859 / 1068	80.4

Table showing the agreement between the lesion pre-operative diagnosis and post-operative histologically confirmed diagnosis for BCC and SCC

Where suspected BCC was found to be another diagnosis on histological examination, the most common diagnoses were benign lesions and SCC. Where suspected SCC was found to be something else the most common histological diagnosis was BCC. Melanoma was present as a very rare (<1%) unexpected diagnosis in both groups.

Tumour size

A total of 3221 recorded procedures provided usable information about tumour size. The mean tumour diameter was 11.4 mm (10.6 mm in 2014), standard deviation 7.1, with the largest diameter being 100 mm (130 mm in 2014). The density distribution plot shows a positive skew (+2.7), where most tumours were under or equal to 20 mm (Figure 9).

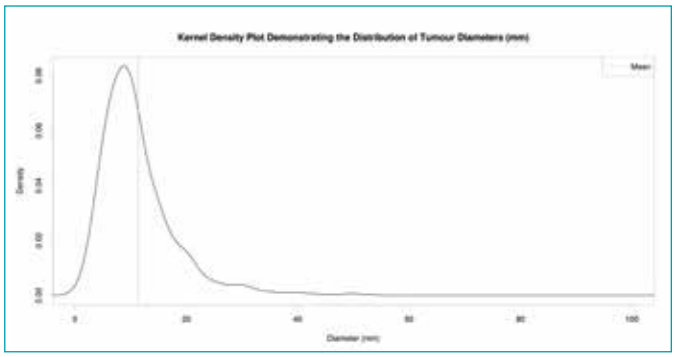

Figure 9. Distribution of tumour size
Density distribution plot demonstrating distribution of tumour diameters in mm.

Types of excision and complications

A total of 3183 excisions were recorded (97%), with 99 re-excisions.

Table 3 shows the number of complications for excisions and re-excisions, respectively.

Table 3. Reported complication rate

Complications	Excision [%]	Re-excision [%]	Total
No	3094 [97.2]	89 [89.9]	3183 [97]
Yes	89 [2.8]	10 [10.1]	99 [3]
Total	3183	99	3282

Complications reported split by excision and re-excision

The risk ratio of complications for re-excision was 3.26 (95% CI 1.75-6.05, P<0.001).

Location in relation to previous scar

Location of BCCs and SCCs within 10 mm of previous excision scars was mapped. BCCs close to previous scars were most likely to be in the periocular/temporal area and on the trunk, whilst SCCs were most likely to be on the scalp, neck or periocular/temporal areas.

Tumour size and margin

Most tumours of any size were likely to be excised by a margin of 1-5 mm (Figure 12), but larger tumour sizes were increasingly likely to be excised with margins >5 mm compared with smaller tumours (Figure 13).

Type of excisions

2772 wounds were closed primarily, 224 required flap repair, 139 required skin graft and 143 were left for second intention wound healing.

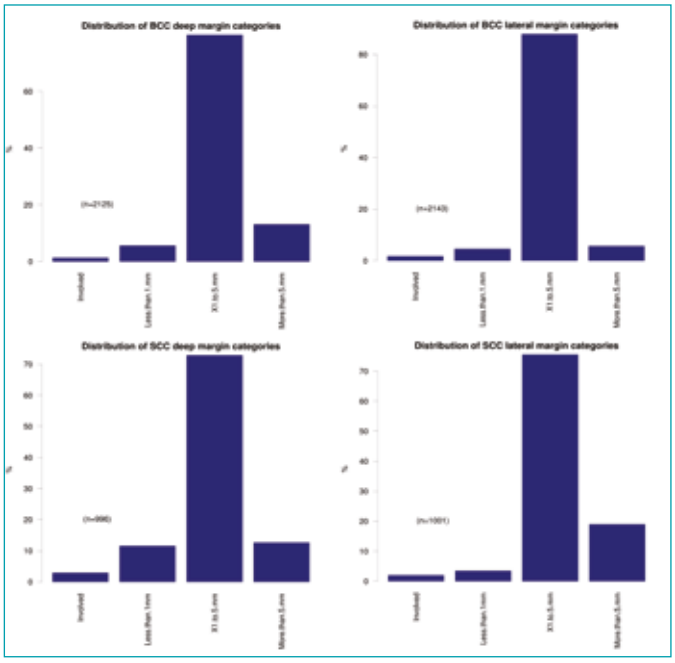

Figure 12. Bar plots of histological excision margins (lateral and deep).

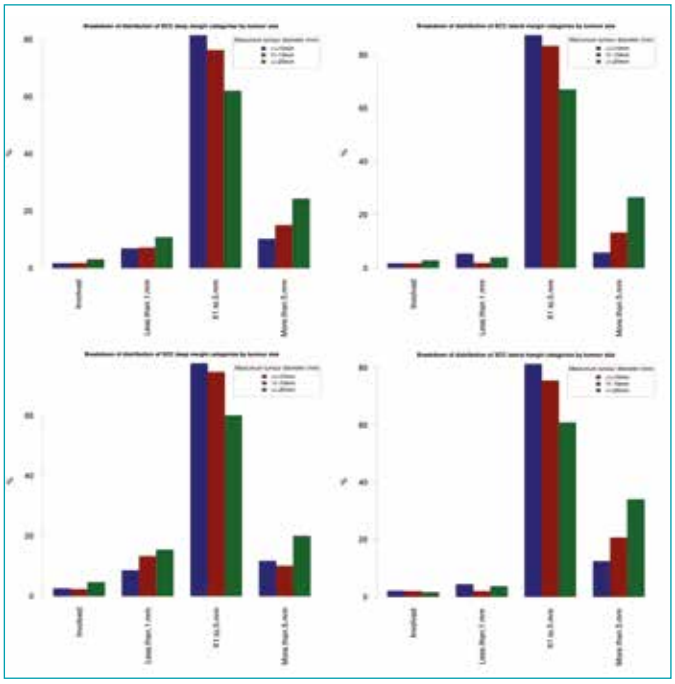

Figure 13. Bar plots of histological excision margins (lateral and deep) split by tumour size. Most excised by 1-5 mm but increasing size increases likelihood of wider excision margin.

Tumour subtype and level of invasion

BCCs often showed multiple subtypes within a single lesion. In the histological reports 30.2% included two distinct subtypes and 4.6% three subtypes or more. A total of 92.3% of BCCs were confined to the dermis.

Of the 544 SCC reports including a description of subtype 407 were of no special type. Of the remaining 137 cases 54.7% were of the keratoacanthomatous subtype.

A total of 651 reports described the level of invasion of SCCs. 16.4% of SCCs invaded into the subcutaneous tissue with 3.1% extending beyond the subcutis.

Completeness of excision

Based on histological diagnoses of BCC, 2149 and 2125 submissions had analysable data for lateral and deep margins, respectively. A total of 38 BCCs were incompletely excised at the lateral margin and 28 were incomplete at the deep, leading to complete excision rates of 98.2% and 98.7% lateral and deep (98.4% and 99.2% in 2014), respectively.

Based on histological diagnoses of SCC, 1001 and 996 submissions had analysable data for lateral and deep margins, respectively. A total of 20 SCCs were incompletely excised at the lateral margin and 29 were incomplete at the deep, leading to complete excision rates of 98.0% and 97.1% lateral and deep (98.0% and 96.0% in 2014), respectively.

Based on all histological lesions recorded, 3150 and 3121 had analysable data for lateral and deep margins, respectively. Overall complete excision rates were calculated at 98.2% lateral and 98.2% deep (98.2% and 98.7% in 2014), respectively. For BCC and SCC (excluding other diagnoses) the overall complete excision rate (lateral or deep or both) was 97.0% (97.7% in 2014).

Completeness of histology reports

Of the 2864 histology reports evaluated only 706 (24.6%) contained all CDIs. 95% of these were synoptic reports. The most commonly omitted data items were level of invasion, risk and T stage. These were absent in 35.7%, 64.2% and 44.1% of reports, respectively.

Conclusion

A total of 95.8% of clinically suspected BCCs were confirmed histologically and 80.4% of suspected SCCs. This is at the upper range of previously published figures on diagnostic accuracy for BCCs being seen in secondary care settings (89.0-95.4%). SCC diagnostic accuracy is higher than previously quoted figures (33.0-68.0%).[5,6] This may over-estimate true diagnostic accuracy due to the way the data was requested. Contributors were asked to record 10 consecutive BCC and 5 consecutive SCC cases. If they were not keeping a log, which included a clinical diagnosis they may have had to rely on searching databases by histological diagnosis, thereby inflating figures for accuracy. However, diagnostic accuracy in 2014 was also high compared to previous reports and there appears to be no reduction, which is encouraging.

The largest single lesion recorded was 100 mm (130 in 2014) but most tumours are less than 20 mm (mean 11.4 mm, SD 7.1) in diameter. This matches the average size of lesions at presentation in most dermatology departments.[8] With clinical margins of 4 to 6 mm according to tumour type and location, this will result in defects of 19.4 to 23.4 mm, mostly on the head and neck.

A statistically significant greater risk of complications was found for re-excisions compared to primary excisions. The relative number of re-excisions and complications remained small. The majority of procedures were primary excisions. Most patients are not followed up in secondary care, which means complication rates probably go under-reported.

The histological reports of non-melanoma skin cancer rarely include all the CDIs found in the NMDS. Synoptic reporting was associated with more complete data. Therefore it is worth encouraging pathology colleagues to adopt this style of reporting to maximise the amount of useful information available for clinical decision making. In addition to this since January 2014 synoptic reporting for cancer resections has been a RCPath Key Performance Indicator (KPI 5.2) and can be assessed at laboratory inspections by the UK Accreditation Service.

Completeness of excision for both BCC and SCC remains high for UK dermatologists participating in this audit with minimal change from 2014. Recording data helps ensure that this information is available for self-evaluation and as evidence to patients that care is of a high standard. The current BSDS surgical log book is a common mechanism for collection of data throughout the year (www.bsds.org.uk/imagelib/downloads/Dr-Brays-Surgical-Log-Book.zip). Further audits might address use of this or similar tools for data collection and wound complication. Data on the latter is not routinely obtained as patients are often not followed up. Ultimately, bringing together the clinical data and histopathology data in a centrally integrated system will enable full national skin cancer data registration and evidence of clinical and histopathological care traceable to those providing it.

References

1. NICE (2006). Improving Outcomes for People with Skin Tumours including Melanoma [WWW Document]. URL https://www.nice.org.uk/guidance/csgstim/evidence/improving-outcomes-for-people-with-skin-tumours-including-melanoma-the-manual-2006-guidance2 [accessed April 2015].
2. Telfer, N. R., Colver, G. B., & Morton, C. A. Guidelines for the management of basal cell carcinoma. *British Journal of Dermatology* 2008; 159(1): 35-48.
3. Motley RJ, Preston PW, Lawrence CM. (2009). Multi-professional Guidelines for the Management of the Patient with Primary Cutaneous Squamous Cell Carcinoma. British Association of Dermatologists [WWW Document]. URL http://www.bad.org.uk/shared/get-file.ashx?id=59&itemtype=document [accessed April 2015]
4. Motley, R., Kersey, P., & Lawrence, C. Multi-professional guidelines for the management of the patient with primary cutaneous squamous cell carcinoma. *British Journal of Dermatology* 2002; 146(1): 18-25.
5. Matteucci P et al. Accuracy in skin lesion diagnosis and the exclusion of malignancy. *J Plast Reconstr Aesthet Surg*. 2011 Nov; 64(11): 1460-5
6. Ahnlide I et al. Accuracy of clinical skin tumour diagnosis in a dermatological setting. *Acta Derm Venereol.* 2013 May; 93(3): 305-8
7. Fremlin GA, Bray AP, de Berker DA. Clinical triage of cutaneous squamous cell carcinoma and basal cell carcinoma to avoid treatment delay: value of an electronic booking system. *Clin Exp Dermatol.* 2014 Aug;39(6):689-95.
8. Bariani RL et al. Basal cell carcinoma: an updated epidemiological and therapeutic profile of an urban population. *Acta Cir Bras.* 2006 Apr; 21(2): 66-73.

Suggested Action	Implementation Date	Any additional notes*	Person responsible	Change Stage
Highlight availability of the surgical log book to Dermatologists	Immediate	Circulate through the newsletter of the BAD	David de Berker	4
Highlight high correlation between completeness of histopathology reporting the use of synoptic reporting	Immediate	Circulate through the newsletter of the RCPath and the BAD	Paul Barrett	4
Undertake national exercise to explore models of audit of wound complications	End of 2018	Undertaken through Health Informatics Subcommittee of the BAD and British Society of Dermatological Surgery	Chair HISC and BSDS	1
Develop national model of standardised recording of surgical complications in skin surgery	End 2019	Undertaken through Health Informatics Subcommittee of the BAD and British Society of Dermatological Surgery	Chair HISC and BSDS	1
Undertake national audit of wound complications in skin surgery	2020	Undertaken through Health Informatics Subcommittee of the BAD and British Society of Dermatological Surgery	Chair HISC and BSDS	1

Change Stage Key: 1.Agreed but not yet actioned; 2.Action in progress; 3.Partial implementation; 4.Full implementation