Correspondence

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Shrinkage of Skin Excision Specimens and Downcoding

Neil Gregory, MD; Michael Mulvaney, MD; Theta Pattison, MD; et alJerome Hill, MD; J. Andrew Carlson, MD, FRCPC; Viktor Goncharuk, MD

Author Affiliations

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Underpayments to providers by payers are a significant cause of lost revenue for medical practices.[1] Resolution of problems such as inappropriate "downcoding" requires proper documentation to support the higher payment level. Recently, downcoding of claims for excision of skin lesions has occurred in our region due to discrepancies between surgical and pathology reported specimen sizes. Efforts to redress these underpayments have proven ineffectual despite explicitly stated guidelines published by the American Medical Association regarding skin lesion measurements[2] and studies demonstrating shrinkage in nonskin tissues.[3,4] According to the *CPT Assistant*,

> The physician should make an accurate measurement of the lesion at the time of excision, and the size of the lesion should be documented in the operative report. A pathology report is less likely to contain an accurate measurement due to shrinkage or fragmentation of the specimen. When coding the removal of a lesion, do not report the size of the surgical defect or the affected area.[2]

To wit, skin shrinkage is an accepted phenomenon. In this study, we assessed the nature and magnitude of changes in size of routine skin excision specimens and the resulting surgical defect.

Patients and Methods

Four measurements were performed on 54 skin excision specimens (mean age of patients, 54 years; range, 13-95 years) from 4 dermatology practices and consisted of (1) length and width of the planned surgical excision; (2) length, width, and depth of the specimen following excision; (3) length and width of the surgical defect; and (4) length, width, and depth of the excision specimen after 24 hours of formalin fixation. Statistical analysis was performed using the paired *t* test and unpaired *t* test.

Results

Most skin specimens and surgical defects showed significant shrinkage (approximately 21%) and enlargement (approximately 25%), respectively (Table 1). A minority of skin specimens showed no change is tissue size (8%), and or an increase in size (4%). Similarly, a minority of patients exhibited no change (9%) or decreases in the surgical defect (6%). These latter 2 groups were unrelated with respect to clinicopathologic findings. Specimen depth showed the greatest variability, with a larger proportion showing no changes (10%) or increase in size (31%).

Table 1.

Table 1. Shrinkage Results From the Patient (In Vivo) to the Surgical Tray (Ex Vivo) and to Removal From the Formalin Bottle (Postfixation) of 54 Skin Excision Specimens*

Dimensions	In Vivo to Ex Vivo Size Change	Ex Vivo to Postfixation Size Change	In Vivo to Postfixation Total Shrinkage	In Vivo to Surgical Defect Size Change
Length	−11 ± 9 (−32 to 6)	−11 ± 16 (−50 to 17)	−22 ± 14 (−57 to 17)	+20 ± 21 (−33 to 73)
Width	−10 ± 13 (−43 to 20)	−12 ± 20 (−53 to 20)	−20 ± 20 (−56 to 33)	+30 ± 31 (−20 to 100)
Depth	. . .	−4 ± 33 (−67 to 100)	. . .	. . .

*Data are mean ± SD (range). The changes in size between all sets of measurements for each dimension were significantly different ($P<.05$, paired t test).

Shrinkage Results From the Patient (In Vivo) to the Surgical Tray (Ex Vivo) and to Removal From the Formalin Bottle (Postfixation) of 54 Skin Excision Specimens*
Significantly less skin shrinkage and defect enlargement occurred in individuals older than 60 years and on the head and neck, whereas extremity wounds had wider defect enlargement (Table 2). Of note, excision specimens of benign processes (melanocytic nevi [26] or cysts [3]) had significantly greater width shrinkage than excisions of malignancies (basal cell [5] and squamous cell carcinomas [10] or melanoma [10]).

Table 2.

Table 2. Tissue Shrinkage and Surgical Defect Enlargement of 54 Skin Excision Specimens*

Clinicopathologic Feature (n)	Size Change, %	
	Specimen	Surgical Defect
Age, y		
>60 (22)	−19 ± 11 × 14 ± 16†	+13 ± 8 × 16 ± 15†
≤60 (32)	−26 ± 14 × 25 ± 18	+24 ± 25 × 39 ± 36
Location		
Head and neck (12)	−14 ± 10 × 16 ± 18‡	+18 ± 6 × 21 ± 4§
Trunk (25)	−25 ± 11 × 24 ± 19	+14 ± 23 × 27 ± 36
Extremity (17)	−22 ± 18 × 21 ± 18	+37 ± 24 × 42 ± 37
Sex		
Male (15)	−24 ± 16 × 20 ± 20	+24 ± 20 × 37 ± 36
Female (39)	−20 ± 11 × 20 ± 17	+19 ± 23 × 27 ± 30
Type of tumor		
Benign (29)	−25 ± 11 × 27 ± 17‖	+22 ± 26 × 31 ± 26
Malignant (25)	−20 ± 14 × 14 ± 17	+18 ± 12 × 30 ± 26
Excision type (scar or not)		
Primary (39)	−25 ± 12 × 23 ± 18	+20 ± 19 × 28 ± 46
Reexcision of biopsy site (15)	−19 ± 14 × 17 ± 17	+20 ± 28 × 24 ± 11

*Data are mean ± SD percentage change in dimensions, length × width.
†$P<.05$.
‡Significant difference ($P<.05$) comparing length only between head and neck specimens vs trunk and extremity.
§Significant difference ($P<.05$) comparing extremity specimens vs head and neck and trunk.
‖Significant difference ($P<.05$) comparing width only, which persisted if site and/or age was matched.

Tissue Shrinkage and Surgical Defect Enlargement of 54 Skin Excision Specimens*

Comment

This study demonstrates that skin specimens predictably shrink by approximately 22%, comparable to values found for other tissues, which range from 8% to 57%.[3-5] In addition, the degree of skin shrinkage is related to age and location—a phenomenon attributed to loss of tensile strength with age and increased

photodamage.[5] In conclusion, the findings reported herein support published guidelines for skin lesion measurement.[2] If pathologic measurements are to be used by payers as a method of monitoring compliance, a correction factor should be used (eg, 1.28; 95% confidence interval, 0.94-2).

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