Utilization of Topical Anesthetics by Dermatologists in the United States

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Topical anesthetics (TAs) are useful for minimizing the pain associated with many superficial medical procedures. To date, the use of TAs in dermatology and other specialties is not well characterized. To illustrate the current use of TAs by dermatologists and other outpatient physician offices, data was collected from the National Ambulatory Medical Care Survey database from 2001 to 2005. Specific agents, diagnoses, procedures, patients' ages, and physicians' specialties were examined, with a particular focus on dermatologists. During 3.8 million office visits over the 5-year study interval, TAs were prescribed and/or used. Patients aged 40 to 59 years accounted for most (53%) of the visits where TAs were used. Dermatology, a specialty performing primarily superficial procedures, accounted for just 4% of TA use. The diagnosis of pyogenic granuloma had the highest per patient use of TAs by dermatologists. Even though TAs are infrequently used by dermatologists, likely due to their fast paced practices, there may be a greater role for them in the future as more convenient agents are developed.

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Topical anesthetics (TAs) have been used since the late 1800s when topical cocaine was discovered to have anesthetic properties.[1] Since then, many ester- and amide-based anesthetics have been developed, and several are now readily available in a topical form. A TA is a local anesthetic that is used to numb the surface of a body part when applied topically with or without occlusion. They are available in creams, ointments, aerosols, sprays, lotions, and jellies. Some of the available agents include benzocaine, butamben, dibucaine, lidocaine, oxybuprocaine, pramoxine, proparacaine, proxymetacaine, and tetracaine. Many of these drugs are often used in topical combinations such as a mixture of tetracaine, adrenaline, and cocaine; a mixture of lidocaine, epinephrine, and tetracaine; topical lidocaine and prilocaine; liposome-encapsulated lidocaine; topical benzocaine, butamben, and tetracaine; and various other preparations.[2,3] The use of TAs helps to alleviate superficial pain and minimize the pain associated with minor medical procedures, including arterial and venous punctures, lumbar punctures, intramuscular and intralesional injections, laser treatments, laceration repairs, skin and mucous membrane biopsies, and prenumbing prior to infiltration with a local anesthetic for pain management with deeper procedures.[1,3-5]

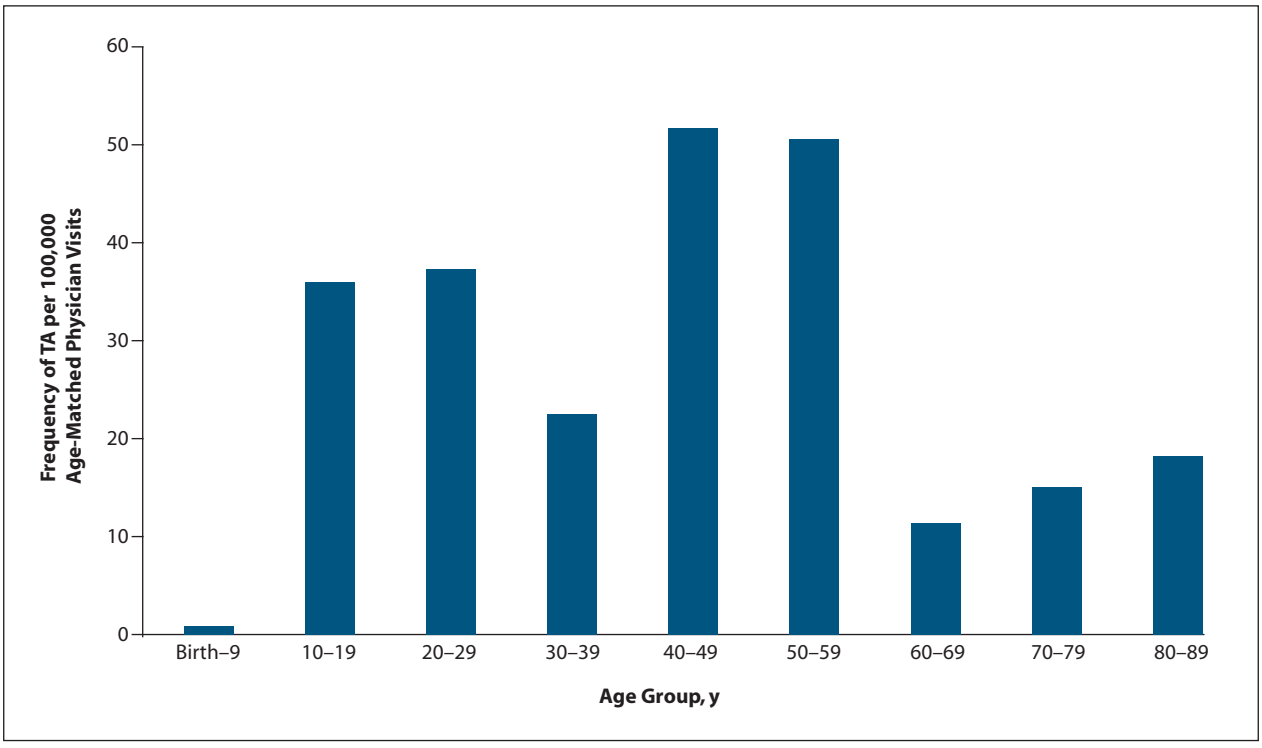
For young children and other patients who become anxious at the sight of a needle or have a low pain threshold, TAs are particularly useful. While they may be particularly useful in dermatology considering the high rate

TABLE 1

Frequency of TA Usage by Physician Specialty

Specialty	No. of Visits With TA Usage	Total No. of Visits per Specialty	TA Usage per 100,000 Visits by Specialty TA
Sports medicine	247,077	6,482,895	3811
Physical medicine and rehabilitation	730,399	32,003,555	2282
Hematology and oncology	90,943	14,885,922	611
Occupational and preventive medicine	55,520	9,680,064	574
Neurology	316,096	82,307,455	384
Orthopedic surgery	473,227	183,440,000	258
Other specialty	37,054	14,646,272	253
Rheumatology	60,063	24,977,278	241
General practice	134,649	86,259,768	156
Family practice	952,826	844,660,000	113
Dermatology	170,267	154,490,000	110
Internal medicine	506,796	610,430,000	83
Gastroenterology	38,497	58,618,971	66
Otolaryngology	47,936	102,380,000	47
Urology	28,155	97,732,447	29
Pediatrics	115,039	449,360,000	26
Gynecological surgery	20,006	101,020,000	20
Ophthalmology	30,021	229,510,000	13
Cardiovascular disease	13,139	123,750,000	11
Psychiatry	7346	133,210,000	6

Abbreviation: TA, topical anesthetic.



The amount of topical anesthetic (TA) use by age group was calculated by dividing the number of visits in which a TA was mentioned by the total number of office visits for the age-matched group. This was then multiplied by 100,000 to yield the number of office visits per 100,000 in which a TA was mentioned.

of superficial surgeries and procedures performed, their frequency of use and application is not well characterized. The authors analyzed a nationally representative sample of outpatient medical practices in the United States to assess the current use of TAs in physicians' offices.

METHODS

The National Ambulatory Medical Care Survey (NAMCS) is conducted by the National Center for Health Statistics and is a representative survey of office-based physician practices in the United States.[6] It provides data on the demographics, diagnoses, and medications prescribed at these encounters and uses a multistage probability sampling design.[7] Each sampled visit is weighted to provide representative estimates. The resulting national estimates describe the use of ambulatory care services in the United States.

The current use of TAs was analyzed from the NAMCS with data from 2001 to 2005 and included all office visits surveyed in which a TA was prescribed. The NAMCS records up to 6 drugs for each office visit, including those drugs that are prescribed, given, or administered during the visit. To analyze the visits at which a TA was used, the authors first identified all drugs mentioned at visits from 2001 to 2005, then excluded those drugs that were not TAs from the analysis. Using software for analyzing statistics, the authors determined the specific TA agents used, the diagnoses and procedures associated with their use, patients' ages, and physicians' specialties.

The study was reviewed and approved by the Intramural Review Board of Wake Forest University School of Medicine in Winston-Salem, North Carolina.

RESULTS

There were 20 specialties that reported use of TAs in the NAMCS data (Table 1). Family physicians used the most TAs overall, whereas sports medicine had a greater per patient use of TAs. Dermatologists used TAs at a frequency of only 110 per 100,000 visits and only accounted for 4% of total TA use by any specialty. Patients aged 40 to 49 years accounted for the most frequent usage (53%) of TAs by any physician (Figure). Patients from birth to 9 years of age only accounted for 0.3% of total TA usage and had the least frequent usage per office visit of all age groups.

The TAs reported in the NAMCS data included 7 separate anesthetics listed either alone or in combination: lidocaine, phenol, marcaine, benzocaine, menthol, tetracaine, and pramoxine. Lidocaine patches were the leading TA used by any physician, whereas dermatologists most often used lidocaine cream (Table 2).

Table 2

Medications Listed for Visits in Which TAs Were Mentioned During Dermatology Office Visits in the United States 2001 to 2005

Generic	TAs	Frequency	TA, %
Lidocaine	Ela-Max	96,097	50.0
Benzocaine	Lanacane, Solarcane	44,348	23.1
Pramoxine	Pramosone	30,491	15.9
Other	Alkaline aromatic	21,221	11.0
Drug Class	**Other Listed Medications**	**Frequency**	
Antihistamine	Carbinoxamine, Atarax (hydroxyzine)	109,405	
Corticosteroid	Lidex, Pramosone, Kenalog (triamcinolone), Temovate, Diprosone	101,927	
Antibiotic	Doryx (doxycycline)	61,452	

Abbreviation: TA, topical anesthetic.

There were 15 diagnoses listed at visits to dermatologists in which a TA was used (Table 3). At just over 11%, pyogenic granuloma had the highest per patient use of TAs. There were only 2 procedures listed that were performed by dermatologists with the aid of a TA from 2001 to 2005, biopsy of skin and subcutaneous tissue, and angioplasty or atherectomy of noncoronary vessel(s). Less than one quarter of 1% of biopsies involved a TA (Table 4).

DISCUSSION

For over 100 years, TAs have been available, and when used properly, provide ample anesthesia for superficial procedures. The primary advantage of TAs is that they can be used to anesthetize small to relatively large areas without the pain associated with injections. Additionally, edema from local injections at surgical or biopsy sites can be avoided. To achieve adequate anesthesia, it is important that these drugs are used properly. Some common mistakes include covering the desired treatment area with gauze or another permeable bandage when an occlusive dressing is required, vigorously rubbing the cream into the skin in absence of a dressing, or extrusion of drug from a tear in a transparent film dressing.[1]

While relatively safe when used appropriately, TAs do carry some risk. Prilocaine and benzocaine are associated with a small risk for methemoglobinemia, especially in children younger than 6 months.[2,8] In children who weigh less than 44 lbs, these compounds should be used with caution and should never cover large areas (>100 cm^2) or be used for durations beyond what is recommended.[9] Lidocaine, however, is not associated with the development of methemoglobinemia; therefore, lidocaine-based products may be a better choice for use in children. Nevertheless, lidocaine comes with its own risks and should be used with caution in patients with congestive heart failure and patients taking drugs that decrease hepatic metabolism.[10] When used improperly, topical lidocaine can cause seizures and even death in otherwise healthy individuals.[11,12] Other systemic medications may also interact with TAs because some of the topically applied drug is absorbed.

Dermatologists primarily use TAs in patients with atopic dermatitis (AD). It may be that the anesthetic is being used to quiet the itch in AD, or that patients with AD have a low threshold for pain. Similar to pyogenic granuloma, AD often occurs in children, an age group of great theoretical benefit from TAs. However, patients from birth to 9 years of age had the least amount of TA usage overall, which may represent physicians' concerns over safety. An exact dose that is absorbed systemically varies by body surface area covered, exposure time, specific type of cream, and is not easily predictable. One study found that a transoral lidocaine 20% patch (46.1 mg total lidocaine) caused elevations of systemic lidocaine in children that was high enough to require inclusion in the calculation of total lidocaine administered to a pediatric patient.[14] Surprisingly, some studies have indicated that

Table 3

Frequency of Diagnoses Seen by Dermatologists and the Percentage Associated With TAs[a]

Diagnoses	ICD-9	Frequency of Diagnosis With TA Mentioned	Total Frequency of Diagnosis	Diagnosis With TAs Used, %
Pyogenic granuloma of skin and subcutaneous tissue	686.1	21,221	192,741	11.0
Systemic lupus erythematosus	710.0	19,366	197,002	9.8
Telogen effluvium	704.02	3861	195,302	2.0
Other and unspecified capillary diseases (eg, hemorrhage, hyperpermeability, thrombosis)	448.9	21,221	1,108,364	1.9
AD	691.8	44,092	2,656,812	1.7
Nevus, nonneoplastic	448.1	10,010	687,013	1.5
Other specified diseases of hair and hair follicles: folliculitis, NOS; perifolliculitis, NOS; sycosis, NOS	704.8	15,047	2,042,543	0.7
Unspecified pruritic disorder; itch, NOS	698.9	3861	809,149	0.5
Dyschromia	709.00	3861	1,662,797	0.2
Other malignant neoplasm of skin, site unspecified	173.9	23,610	11,150,874	0.2
Benign neoplasm of skin, site unspecified	216.9	29,376	15,172,501	0.2
Contact dermatitis and other eczema	692.9	22,769	12,180,503	0.2
Unspecified disorder of skin and subcutaneous tissue	709.9	4117	2,223,890	0.2
Actinic keratosis	702.0	27,471	22,586,888	0.1
Other follow-up examination	V67.59	4117	4,231,769	0.1

Abbreviations: ICD-9, *International Classification of Diseases, Ninth Revision*; TA, topical anesthetic; AD, atopic dermatitis; NOS, not otherwise specified;
[a]Diagnoses obtained from any of the 3 listed diagnoses in National Ambulatory Medical Care Survey for visits to the dermatologist in which a TA was used.

systemic uptake of topical lidocaine is faster than with local subcutaneous injections.[15,16]

One limitation of this review is that cosmetic procedures and TA utilization by medispas are not reported in the NAMCS. While these drugs are useful when performing several procedures, including incisions, biopsies, injections, and laser treatments, they are currently being used for only a tiny fraction of office procedures. The largest group of patients receiving these drugs is aged 40 to 59 years, with the lidocaine 5% patch being the most frequent drug prescribed. Interestingly, the lidocaine 5% patch is rather effective at relieving postherpetic neuralgia and other chronic neuropathic pain disorders, but generates little to no anesthesia in the skin itself.[13]

Despite the high number of superficial procedures dermatologists perform, TAs are infrequently used. Possible explanations for the underutilization of these drugs in dermatology are slow onset of action and the aforementioned concern over safety and predictability. Most TA creams must be applied for at least 30 minutes prior to any procedure to have an effect.[17] The quick pace of

TABLE 4

Proportion of Office Procedures Performed by Dermatologists in Which a TA Was Prescribed from 2001 to 2005[a]

Procedure	Estimated Procedures With TAs	Estimated Total Procedures Performed	Procedures Performed With TAs, %
Biopsy of skin and subcutaneous tissue	25,082	11,568,256	0.22
Angioplasty or atherectomy of noncoronary vessel(s)	21,221	21,221	100.00

Abbreviation: TA, topical anesthetic.

[a]Code from 2005 only.

dermatology may not be conducive to the use of current agents. As new agents are developed that are easier and more rapidly effective, there may be a place for greater use of these agents, especially considering the growth of minor procedures (eg, botulinum toxin injections, injection of fillers, laser treatments, or procedures in children) in many practices.

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