Dermatology for the Nondermatologist: A Problem-Oriented System

We describe a logical and systematic approach to unknown dermatologic disease entities that utilizes a simple algorithm which, when properly applied, expeditiously narrows the differential diagnosis and provides a key to standard reference books. We find this algorithm system to be superior to the common and often frustrating exercise of leafing through the dermatologic atlas in search of a picture that matches the presenting rash. [Lynch PJ, Edminster SC: Dermatology for the nondermatologist: A problem-oriented system. Ann Emerg Med August 1984;13:603-606.]

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INTRODUCTION

Although patients with dermatologic disorders rarely present with emergency problems, they are, whether because of cosmetic disability and troublesome symptoms or convenience, seen often in emergency departments.

The key to emergency department management of the patient with dermatologic disease is fast, accurate diagnosis, because all necessary additional information can be found easily in standard reference books. Hit and miss methods must be supplanted by an orderly approach that is both systematic and reliable. We believe that this can be accomplished using a problem-oriented diagnostic algorithm (Figure 1).

THE ALGORITHM

The dermatologic diagnostic algorithm (Figure 1) was constructed by Lynch about 10 years ago, and since then it has been modified gradually in response to suggestions made by others.[1] The goal has been to include in the algorithm only that information needed for 95% diagnostic accuracy. Accordingly the diagnostic possibilities included are the 50 most commonly encountered dermatologic conditions plus 15 additional diseases which, although seen less often, are so serious, so contagious, or so treatable that their prompt and correct recognition is essential. These 65 diseases are subdivided into 10 categories based on similarities in appearance (Figure 2). All diseases with shared morphology, regardless of differences in etiology or pathogenesis, are placed in the same major diagnostic group. Based on the concept that "uncommon manifestations of common diseases are more common than uncommon diseases," those conditions with polymorphic, or variable, presentations are listed in more than one group. For example erythema multiforme may occur with or without blisters; it is included in both the vesiculo-bullous and vascular reaction groups so that either form will be recognized.

The 65 diseases plus the multiple listings for several of the diseases result in the grouping of eight to 12 diseases in each of the ten major diagnostic categories. Because that number may be too high for quick reference book confirmation, each of the ten major diagnostic groups has been subdivided into two or more shorter categories based on easily recognizable diagnostic morphologic characteristics. For example the vesiculo-bullous diseases are subdivided as diseases primarily vesicular and those primarily bullous.

The algorithm itself is followed using questions (Figure 1) to create a series of branching logic points. Most of the questions are self-explanatory, but a few require definition or clarification (Figure 3). The fluid-filled (blistering) diseases are recognized easily when the blisters are large and the roofs are intact. Vesicles that are 1 to 2 mm in size are missed easily unless close

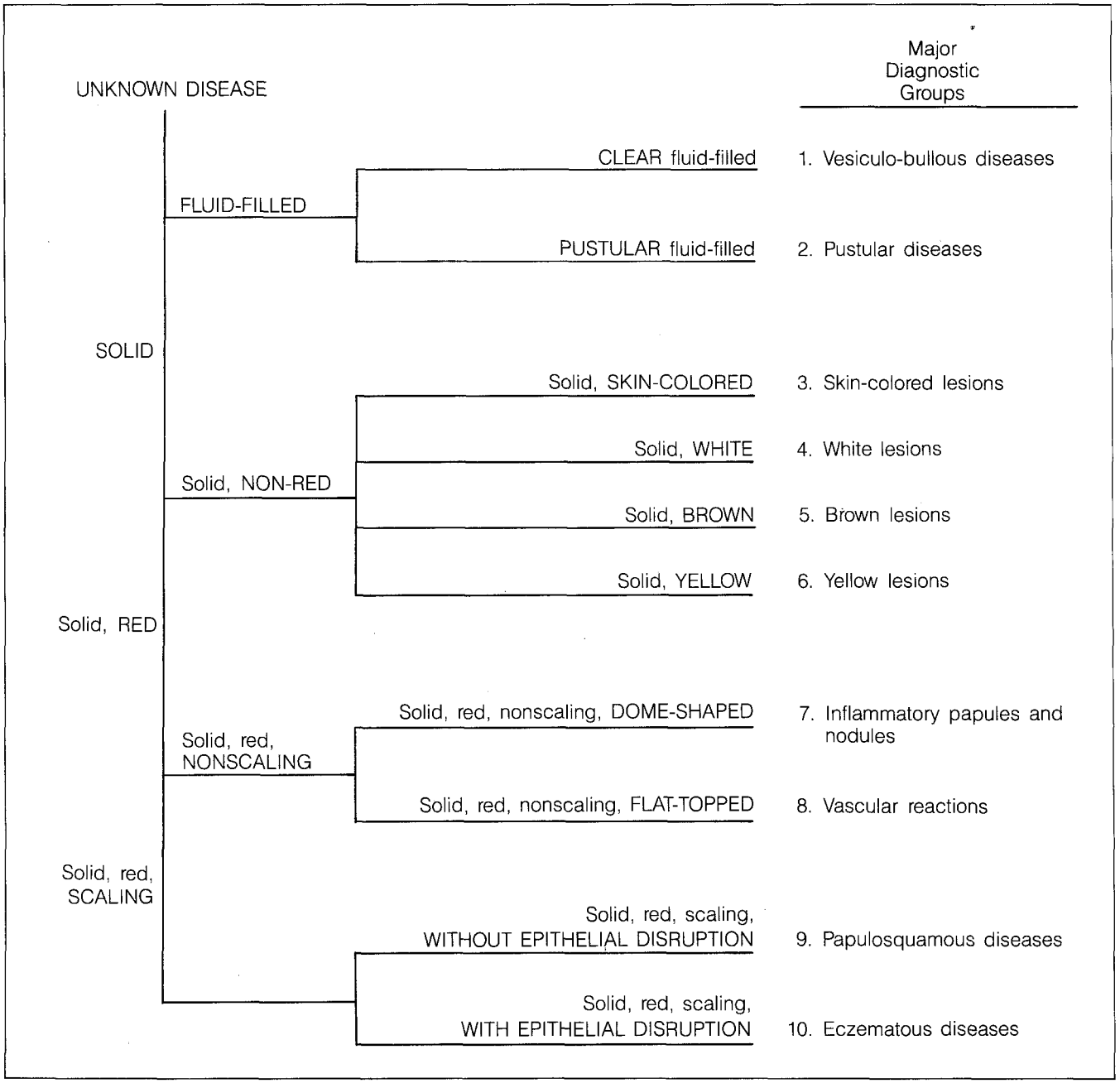

Fig. 1. *The algorithm (modified from Lynch[1]).*

Fig. 2. *The major diagnostic groups.*

inspection is performed. A broken blister is recognized by the presence of a shallow, round erosion encircled by a small collarette of peripheral remaining roof fragment.

Pustules are vesicles that are solidly packed with polymorphonuclear leukocytes. They are bright white in color from inception. Cloudy vesicles are not pustules. Vesicles and bullae differ only in diameter; the transition point occurs between 1.0 and 1.5 cm.[1]

Solid lesions are characterized as macules, patches, papules, nodules, and plaques. Macules and patches are areas of flat, nonpalpable color change; they differ only in diameter, with the transition point occurring between 1.0 and 1.5 cm.[1] Papules, nodules, and plaques are palpable, usually visibly elevated lesions; when less than 1.0 to 1.5 cm in diameter, they are papules. Larger lesions that are dome-shaped in cross section are nodules; larger lesions that are flat-topped in cross section are plaques.

Solid lesions are skin-colored when they match the hue of the surrounding skin. Thus skin-colored lesions will appear brown in a dark-skinned individual and will appear nearly white in fair-skinned individuals. Brown lesions are always darker and white lesions are always lighter than surrounding skin.

The presence of scale often is overlooked. Large flakes of gray-white scale (psoriatic-type) are not difficult to recognize, but granular, powdery

I. Vesiculo-Bullous Diseases
- A. Vesicular disease
  1. Herpes simplex
  2. Varicella-zoster
  3. Vesicular tinea pedis
  4. Dyshidrosis (pompholyx)
  5. Scabies
  6. Dermatitis herpetiformis
- B. Bullous disease
  1. Poison-ivy-type contact dermatitis
  2. Bullous impetigo
  3. Erythema multiforme bullosum (Steven Johnson syndrome)
  4. Pemphigoid
  5. Pemphigus

II. Pustular Diseases
- A. True (soft pustules)
  1. Acne vulgaris
  2. Rosacea (acne rosacea)
  3. Bacterial folliculitis
  4. Fungal folliculitis
  5. Candidiasis
  6. Systemic bacterial infection (eg, gonorrhea)
- B. Pseudo-pustules
  (See white papules, Group IV)

III. Skin-Colored Lesions
- A. Keratotic (rough-surfaced lesions)
  1. Warts: verruca vulgaris, paranychial and plantar warts
  2. Actinic keratoses
  3. Seborrheic keratoses
  4. Corns and calluses
- B. Nonkeratotic (smooth lesions)
  1. Warts: genital warts, flat warts
  2. Basal and squamous cell carcinoma (with or without ulceration)
  3. Epidermoid ("sebaceous") cysts
  4. Lipomas
  5. Molluscum contagiosum
  6. Nevi: intradermal

IV. White Lesions
- A. White patches and plaques
  1. Pityriasis alba
  2. Pityriasis (tinea) versicolor
  3. Vitiligo
  4. Postinflammatory hypopigmentation
- B. White papules
  1. Milia
  2. Keratosis pilaris
  3. Molluscum contagiosum
  4. Sebaceous gland hyperplasia

V. Brown Lesions
- A. Brown macules
  1. Freckles
  2. Lentigenes
  3. Nevi: junctional
- B. Brown papules and nodules
  1. Nevi: compound and intradermal
  2. Seborrheic keratoses
  3. Melanoma
- C. Brown patches and plaques
  1. Cafe-au-lait patches
  2. Postinflammatory hyperpigmentation
  3. Giant congenital nevi
- D. Generalized hyperpigmentation
  1. Secondary to systemic disease
  2. Secondary to medication
  3. Postinflammatory hyperpigmentation

VI. Yellow Lesions
- A. Smooth yellow lesions
  1. Xanthelasma
  2. Necrobiosis lipoidica diabeticorum
  3. Sebaceous gland hyperplasia
- B. Rough yellow lesions
  1. Actinic keratoses
  2. Any crusted lesion (see vesiculo-bullous diseases, eczematous and insect bites)

VII. Inflammatory Papules and Nodules
- A. Nonscaling red papules
  1. Insect bites
  2. Cherry angiomas
  3. Spider angiomas
  4. Granuloma annulare
  5. See nonconfluent papules, Group IX
- B. Nonscaling red nodules
  1. Furuncles
  2. Inflamed epidermoid cysts
  3. Hidradenitis suppurativa
  4. Erythema nodosum

VIII. Vascular Reactions
- A. Nonpurpuric (blanchable) lesions
  1. Toxic erythema: exanthems, medications, photosensitivity
  2. Urticaria: infection, medications
  3. Erythema multiforme
  4. Cellulitis (erysipelas)
- B. Purpuric lesions
  1. Vasculitis (PMN type, palpable purpura)
  2. Actinic ("senile") purpura
  3. Petechia and ecchymoses secondary to medications

IX. Papulosquamous Diseases
- A. Prominent plaque formation
  1. Psoriasis vulgaris
  2. Tinea: corporis, capitis, pedis and cruris
  3. Lupus erythematosis: discoid type
  4. Parapsoriasis-mycosis fungoides
- B. Nonconfluent papules
  1. Pityriasis rosea
  2. Lichen planus
  3. Syphilis: secondary
  4. Psoriasis: guttate type

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X. Eczematous Diseases
- A. Excoriations prominent
  1. Atopic dermatitis (neurodermatitis, lichen simplex chronicus, infantile eczema)
  2. Dyshidrotic eczema
  3. Stasis dermatitis
  4. Tinea: cruris, capitis, pedis
  5. Psoriasis in atopic individuals
  6. Candidiasis
- B. Little or no excoriation
  1. Seborrheic dermatitis
  2. Contact dermatitis
  3. Xerotic (asteatotic) eczema
  4. Impetigo
- C. Eczematous reaction patterns (seen with more than one of the above eczematous diseases)
  1. Hand and foot eczema
  2. Diaper dermatitis
  3. Nummular eczema
  4. Exfoliative erythrodermatitis
  5. Autoeczematization (autosensitization, "Id" reaction)

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Fig. 3. *Basic terminology.*

Macule — < 2 cm diameter area of color change, with no palpable substance.

Patch — > 2 cm diameter macule.

Papule — Palpable mass < 1.5 cm diameter.

Nodule — Spherical enlargement of a papule > 1.5 cm diameter.

Plaque — Flat-topped palpable lesion > 1.5 cm diameter. Papule that is enlarged in 2 dimensions.

Wheal — Edematous papule on plaque. Nonloculated fluid.

Vesicle — Fluid-filled papule < 1-1.5 cm diameter.

Bulla — > 1-1.5 cm vesicle.

Pustule — Vesicle packed full of polys (may or may not be sterile).

Excoriation — Scratchmarks.

Lichonification — Thickening secondary to chronic rubbing or scratching (seen only in eczematous diseases).

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scale (pityriasis-type) and shiny, compacted, adherent scale (lichen-type) will be missed unless the surface is scraped lightly and palpated for slight roughness. Recent bathing or application of any creamy or oily preparation may obscure the original presence of scale unless this point is specifically explored in questioning the patient.

Some difficulties may occur in differentiating between the seventh (inflammatory papules and nodules) and eighth (vascular reactions) groups. All solitary lesions are placed in the seventh group and all purpuric lesions are placed in the eighth. Plaque formation occurs more commonly in the eighth group; annular (ring-like) lesions can be seen in either.

Major difficulties are encountered in separating the papulo-squamous diseases of the ninth group from the eczematous diseases of the tenth group unless the signs of epithelial disruption are sought. Subtle signs of epithelial disruption include the presence of angular erosions (excoriations), fine linear fissures, yellow crusts, and a subtle yellow color to whatever scale is present. Diffuseness of marginations (indistinct transition between the edge of the lesion and adjacent normal skin) and the presence of lichenification also favor diagnosis of the eczematous diseases.

SUMMARY

The algorithm allows the emergency clinician examining a patient with cutaneous disease to arrive systematically at a limited but reasonably inclusive list of differential diagnoses. Given this list, the two or three most likely diagnostic possibilities can be compared easily in a standard dermatology reference and with only a few paragraphs of reading, a single-most-likely diagnosis can be chosen. Then, depending on the level of certainty obtained and the complexity of the problem identified, definitive therapy can be initiated. One of us (PJL) has used this algorithm successfully in the teaching of students and residents for more than 15 years.

Most clinicians, regardless of their practice setting, experience a feeling of hopeless resignation when it comes to the diagnosis of cutaneous disease. We believe that use of this algorithm can replace that feeling with self-satisfaction and enthusiasm for the care of the patient with troubling dermatologic problems.

REFERENCE

1. Lynch PJ: *Dermatology for the House Officer: Problem Oriented Approach*, ed 1. Baltimore, Williams and Wilkins, 1982.