

Chapter 43

Biopsy of Skin Lesions

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Abstract This chapter discusses the complexity of issues to consider when determining to do a relatively easy and inexpensive procedure – punch biopsy. Reviewed are lesions appropriate to diagnose with punch, and absolute contraindications to punch, which are few but serious. Review of data and consensus guidelines are clear regarding pigmented lesions highly suspicious for melanoma but there is no clear cut recommendation for type and size of biopsy for a myriad of other lesions. How to obtain a full thickness tissue sample, closure and wound care is outlined. General points of discussion to be reviewed with patients regarding the goal of the procedure and individual considerations are made.

Keywords Punch biopsy • Suspected melanoma • Incisional • Excisional • Wound closure • Full thickness skin biopsy

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Indications

Punch biopsies are a simple, practical and inexpensive diagnostic tool. Compared with excisional biopsies, very little training and experience is needed to do a skin punch biopsy well. However, choosing which biopsy technique and which lesion to biopsy is a complex decision. There are few evidence-based or best practice consensus guidelines to direct which type of biopsy to perform and how big the tissue specimen should be. National Comprehensive Cancer Network (NCCN) guidelines and an overwhelming amount of data recommend an excisional biopsy with a 1–3 mm margin for pigmented lesions worrisome for melanoma. However, for patients presenting with a variety of symptomatic lesions or worrisome dermatoses, early and rapid diagnosis is essential and a punch biopsy is often the preferred approach. Skin cancer is the most common of all cancers. Early detection and treatment can lead to cure even if a lesion is malignant and early biopsy is critical to diagnosis. Once the decision to perform a punch biopsy is made, it is essential to clearly explain to the patient the indication for the procedure, the technique and the potential complications including missed diagnosis due to sample error or need for further surgery to definitively treat the lesion.

Excisional biopsies are expensive and time consuming procedures which require visits for both the procedure and the subsequent suture removal. They also create bigger defects, more scarring and potentially conflict with the surgeon's intended approach in cases where a wide local excision and sentinel node biopsy are required. Draining lymph basins can potentially be obscured with larger biopsies. Excisional biopsies also have the potential for poorer cosmesis [1]. Punch biopsies are a perfect diagnostic tool for inflammatory lesions or for small pigmented lesions. All the layers of the skin including the epidermis, dermis and upper parts of the subcutis are included in a punch specimen.

An estimated 76,100 new cases of invasive melanoma will be diagnosed in the US in 2014 [2]. In 2015, 1 in 50 Americans will develop melanoma and 1 in 5 Americans will develop

basal cell carcinoma or squamous cell carcinoma [3]. Many cancers can be cured by early excision. Despite the possible interference with T-staging a malignant lesion, errors from failing to biopsy due to time and healthcare cost constraints are worse than using the non-excisional (punch) technique to diagnosis possible malignancy.

Non-excisional biopsy may result in inadequate histology. However, a review of nine studies demonstrates that non-excisional biopsy of primary lesions with poor prognostic indicators has no effect on prognosis [4]. The type of biopsy performed does not influence survival rates in patients with melanoma [5]. Partial biopsies may result in misdiagnosis and inaccurate microstaging [6]. For patients presenting with large lesions which are obviously malignant melanoma, complete excision with 1–3 mm margins is often impractical or too morbid. If complete excision cannot be performed as a primary procedure, then a punch of the most suspicious or thickest area should be done [5]. Moreover, if the initial tissue obtained is inadequate, additional biopsy is recommended.

Preoperative Care

Site Selection of Lesion

Punch biopsy is indicated with all suspected neoplastic lesions, lesions that require evaluation of the deeper dermis, all bullous disorders and to clarify a diagnosis when the differential list is limited [4]. For inflammatory lesions, biopsy the newer lesions with erythema. If possible take samples from several representative stages of the process. For blistering lesions, biopsy the newest vesicles and blisters first, within 48 h of onset. Older lesions may yield obscured pathological information. For very large lesions, biopsy the center or the most abnormal area or the thickest area [4]. For vesicles, biopsy them intact when possible, with some adjacent normal skin [4]. For bullae/circumscribed fluid filled lesions >1 cm in diameter, biopsy the edge to include a part of the blister with adjacent intact skin [4].

Contraindications

Avoid face and distal lower extremities and over the tibia if possible to avoid cosmetic problems and delayed healing. Lesions on the distal lower extremities can show histological signs of stasis. Also avoid axilla and groin if possible to avoid secondary infection [1]. There are rare absolute contraindications to punch biopsy. Use caution with patients on anticoagulation therapy and carefully consider the site. Take particular care when working near large pulsatile vessels in the trunk or head and neck [7]. Warfarin/Coumadin, Plavix/clopidogrel and aspirin should not be discontinued for a simple punch. A punch site on limbs with a bypass graft, near large vessels or articular capsules is contraindicated. One case study reports a massive arterial bleed from a 5 mm punch biopsy causing an arteriotomy to right femoral to anterior tibial artery Teflon bypass graft located at the distal right lateral thigh [8]. Allergic reactions to anesthesia are rare. Use caution when using lidocaine with cardiac patients. Anaphylactic reactions or arrhythmias may occur, therefore, it is important to be ready to perform basic resuscitation if needed [7]. If a full thickness excision with punch is inappropriate due to large size of the lesion or location, such as: face, or near a vessel graft, then modification of the approach is reasonable and warranted [9].

Review medications, allergies, recent treatments of the lesion and concomitant illnesses. Obtain informed consent. Discussion should include the risk of infection, bleeding and potential scarring. Tissue sampling error and a caveat that more complicated surgery or diagnostic tests are a possibility should be discussed.

Positioning and Anesthesia

Skin Preparation

Use chlorhexidine to cleanse the skin. It is effective against gram negative and positive bacteria and lasts for several hours. Alcohol provides poor coverage against gram negative



FIGURE 43.1 Inject anesthetic (Courtesy of Andrew M. Swanson MD)

bacteria but it can be used if chlorhexidine is not available. Povidone-iodine is also acceptable to prepare the site.

Anesthetic

Outline the clinical margins of the lesion in indelible ink, preferably using a sterile pen, after adequate skin preparation but before instillation of anesthetic fluid (See Fig. 43.1).

Use 1 or 2 % lidocaine with epinephrine. An allergy to procaine (Novacain) is not a contraindication to the use of lidocaine [1]. Buffer the sting with lidocaine (A 10:1 ratio of lidocaine: sodium bicarbonate 8.4 % NaHCO_3) will minimize the pain (1 mL of NaHCO_3 with 9 mL of lidocaine) [10]. Use a small long needle: ½ inch/gauge 27 or 26 or 5/8 inch/gauge 25. Warm the solution by gently rolling the vial between your hands. Inject perpendicular (90°) to the skin. Sensory nerve endings branch out like a tree and if the skin is penetrated at a 90° angle then the needle intersects fewer nerves [11]. The



FIGURE 43.2 Make a wheal injecting at 45° (Courtesy of Andrew M. Swanson MD)

first 0.2–0.5 mL should be injected intra-dermally, to form a wheal beneath the skin. Then change the angle and slowly inject more anesthetic (See Fig. 43.2).

Keep 0.5 mL of palpable anesthetic ahead of the tip of the needle. This will anesthetize subdermal nerve endings in front of the tip of the needle [10]. Wait about 5 min for the effect of the lidocaine with epinephrine to take effect. You can use this time to fill out forms and discuss wound care with the patient. Epinephrine is absolutely contraindicated in digital and penile blocks because it may compromise blood flow [10].

Description of the Procedure

This is a clean, not sterile procedure. If the patient is at risk of infection, or immunocompromised, it should be done with sterile technique.



FIGURE 43.3 Pull skin perpendicular to Langer's lines (Courtesy of Andrew M. Swanson MD)

- Non-sterile gloves
- 3 ml syringe filled with lidocaine with epinephrine (hemostasis is improved but may cause blanching and obscure outline of lesion)
- 30 g needle 0.5 or 1 inch
- Punch biopsy circular blades are available in 2–8 mm diameters. A 4 mm punch tool is usually used.
- Scissor
- Labeled formalin containers
- 4-0, 5-0 or 6-0 nylon suture
- Needle driver
- Tissue forceps to close wound not to pick up the specimen

Clean the skin, mark with a sterile skin marker. The lesion should be outlined in case of blanching due to epinephrine with lidocaine. Stretch the skin perpendicular or 90° to the Langer's lines. Langer's lines are the tension lines and they usually run perpendicular to the underlying musculature but can vary within individuals (See Fig. 43.3).



FIGURE 43.4 Remove the disposable punch without twisting (Courtesy of Andrew M. Swanson MD)

To find the Langer's lines, gently pinch the skin and look for parallel lines, hold tension in the opposite direction of the Langer's lines when the punch is being performed. This will turn the round punch hole into a more elliptical defect that parallels the skin's natural tension lines. This procedure will allow for a more oval shape and can be closed more easily with a suture. Place the circular blade on the skin at a 90° angle and twist back and forth until you feel a 'give' in the skin- you know you are in the fat when the tugging sensation is gone. Do not pull the punch tool in and out of the wound to check progress (See Fig. 43.4).

When you feel the 'give' of the fat then remove the punch and depress the skin around the defect and use the injection needle to pierce the core specimen and place in container (See Fig. 43.5).

You may need to use a scissors to cut the base of the specimen to free it up. Avoid using forceps to remove the tissue from the defect as they can cause crush artifact of the specimen (See Fig. 43.6).



FIGURE 43.5 Avoid crush artifact by removing tissue with injection needle (Courtesy of Andrew M. Swanson MD)



FIGURE 43.6 Cut the base of the specimen with a scissors (Courtesy of Andrew M. Swanson MD)

Apply pressure over the defect with gauze. Cover with white petrolatum. It is a safe wound care ointment for ambulatory surgery procedures and decreases the risk of allergic reactions and gram-negative bacterial superinfections [5]. Cover the petroleum with dry sterile gauze.

Wound Closure with Suture

Defects >4 mm close with 1–2 interrupted sutures (See Fig. 43.7).

Secondary intention healing and suturing have similar cosmetic results for lesions 1–4 mm in diameter [5]. Use 4–0 or 5–0 monofilament nylon suture. Unbraided nylon will decrease infection but may be more difficult to use. Use a cutting needle. C-17 needles were made to close punch biopsy defects. The higher the number of the needle, the larger the body and length of the needle is. Grab the needle at about 1/3 from the eye and insert in the skin perpendicular to the skin about 2 mm from the edge of the wound (See Fig. 43.8).



FIGURE 43.7 Use a cutting needle to suture (Courtesy of Andrew M. Swanson MD)



FIGURE 43.8 Close the defect with 1 or 2 interrupted sutures (Courtesy of Andrew M. Swanson MD)

Specimen

Label the specimen and provide as much clinical information as you can –site, size of punch, history of lesion, treatment of lesion prior to biopsy and concomitant diseases if applicable. Place the specimen in formalin and send to a dermatopathologist.

Postoperative Care

Remove the gauze in 24 h. If sutured, remove sutures in 7–10 days.

Complications

Complications are rare but include bleeding or infection. If bleeding occurs it can be controlled with pressure dressings or with sutures. Infection will likely occur within 2 or 3 days

after biopsy. Watch for redness, swelling, change in drainage color, warmth to area, or fevers. Infections can be treated with oral antibiotics.

Conclusion

It is important to remember that, except for lesions in regions which make excisional biopsies an impractical solution, punch biopsies are not ideal for lesions suspected for melanoma. Nonetheless, the punch biopsy is a very helpful tool to diagnose many types of skin lesions and its comparative simplicity and relative low cost make the punch biopsy the most efficacious procedure in many instances. In fact, for certain lesions, punch biopsies can even serve as the treatment.

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