education

FROM THE JOURNALS Edited highlights of weekly research reviews

Happy Zappy: ablating atrial fibrillation

If you had persistent atrial fibrillation, would you try drugs first or opt for ablation? This three year follow-up of 303 patients in the EARLY-AF trial, found that initial ablation was associated with fewer episodes of persistent atrial fibrillation compared with antiarrhythmic drug therapy (1.9% *v* 7.4%), less recurrent atrial tachyarrhythmia (56.5% *v* 77.2%), and reduced atrial fibrillation burden, which is the percentage of monitored time spent in atrial fibrillation (0 *v* 0.12%). Implantable devices improved reliability of the findings, but drug therapy may not have been optimal in all cases, which would limit the reliability of the results. Overall, ablation was safe compared with antiarrhythmic drugs, with serious adverse events of 4.5% versus 10.1%.

N Engl J Med doi:10.1056/NEJMoa2212540

Happy Zappy: the sequel

Ablation of the pulmonary veins (pulmonary vein isolation), where most ectopic beats originate in persistent atrial fibrillation, works well. The question is whether zapping the left atrial posterior wall, which may also be a source of ectopic beats, in addition, produces even better results?

This first ever randomised trial comparing pulmonary vein isolation plus posterior wall isolation with pulmonary vein isolation alone, in 338 patients with persistent atrial fibrillation, found no significant difference in the number who remained free of recurrent atrial arrhythmias without medication for a year after their first catheter ablation procedure (52.4% *v* 53.6%). I was surprised that ablation only works in half of cases and that posterior wall isolation didn't improve the outcome, when theoretically it should. Multiple ablation procedures pushed up the success rate but still failed to show any benefit from adding posterior wall isolation (58.2 *v* 60.1%). It took significantly longer to zap the posterior wall as well as the pulmonary vein (ablation time 24 *v* 28 minutes) with no discernible benefit.

JAMA doi:10.1001/jama.2022.23722

Do healthy diets work?

This is perfect January fodder. A huge US cohort study asked whether there's any association between recommended national dietary guidelines and total and cause-specific mortality. Follow-up of more than 75 000 women from the Nurses' Health Study and more than 44 000 men from the Health Professionals Follow-up Study between 1984-6 and 2020 showed that greater adherence to several healthy eating patterns laid out in US dietary guidelines was associated with a lower risk of death across different racial and ethnic groups (comparing highest with lowest quintiles, pooled multivariable adjusted hazard ratio of total mortality was 0.8), and all dietary scores were significantly inversely associated with death from cardiovascular disease, cancer, and respiratory disease.

Diets are a mix of multiple components, so these types of studies can only examine combinations of foods rather than individual foods; who knows whether it's blueberries alone or the whole fruit salad that make you live longer? Unhealthy diet is now a leading preventable cause of death globally, and providing realistic and reliable advice is arguably one of our most important tasks as doctors.

JAMA Intern Med doi:10.1001/jamainternmed.2022.6117

Positive news for HER2

Women with HER2-positive metastatic breast cancer that has persisted or recurred after first line treatment with trastuzumab and a taxane (with or without pertuzumab) need effective and safe second line treatment options. In this multicentre trial of 524 women, trastuzumab deruxtecan (which delivers the toxic substance deruxtecan into cancer cells) showed a statistically significant improvement in overall survival versus trastuzumab emtansine (which contains the cytotoxic agent DM1.)

Trastuzumab deruxtecan resulted in better median progression-free survival (28.8 months *v* 6.8 months), higher overall survival at 12 months (94% *v* 86%), and greater objective response rates (79% *v* 35%). The safety profiles were similar, with serious adverse events including interstitial lung disease of 25% versus 22%. Better antiemetic treatment may improve the acceptability of the treatment.

Lancet doi:10.1016/S0140-6736(22)02420-5

High stakes for kidneys

What can we offer patients with chronic kidney disease (CKD) to keep their kidneys functioning for as long as possible? This multicentre, two year study of 6609 people with an eGFR of 20-45 mL/min/1.73 m^2 (or 45-90 and albuminuria) found that there was less progression of CKD and fewer deaths from cardiovascular causes in patients treated with empagliflozin, usually used to treat diabetes, than placebo, regardless of whether they had diabetes and how severe their CKD was (13.1% *v* 16.9%). There was no difference in the number of serious adverse events. Disappointingly, there was no significant difference in overall death rates (4.5% *v* 5.1%), but this EMPA-KIDNEY trial adds to other large trials (CREDENCE and DAPA-CKD) which showed similar results in terms of disease progression and cardiovascular deaths.

Ann Intern Med doi:10.7326/M22-2904

Ann Robinson, NHS GP and health writer and broadcaster

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Fetal monitoring in labour: summary and update of NICE guidance

CPD READING
0.5 HOURS

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Further information about the guidance, a list of members of the guideline development group, and the supporting evidence statements are in the full version on bmj.com.

The NHS must support high quality, safe care for women and babies, ensuring that the woman or birthing person is empowered to make decisions about their care. However, in recent years multiple reports have highlighted concerns about care in labour[1 2] and safety concerns over inconsistent approaches to cardiotocograph (CTG) categorisation, with three different classifications in use.[3-5] This article summarises recommendations from the recent update of the National Institute for Health and Care Excellence (NICE) guideline on fetal monitoring in labour.[6] The update includes an evidence review for fetal blood sampling and recommendations on fetal monitoring based on the Guideline Committee's experience and opinion. Simplifying the categorisation of CTGs, with an emphasis on regular assessment and checking on "How is the baby?", is in line with the work of the Avoiding Brain Injury in Childbirth (ABC) collaboration by the Royal College of Obstetricians and Gynaecologists, Royal College of Midwives, The Healthcare Improvement Studies (THIS) Institute[7] and recent opinion[8] (see box).

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE.

Committee members involved in this guideline update included three lay members who contributed to the formulation of the recommendations summarised here.

WHAT YOU NEED TO KNOW

- The new guideline on fetal monitoring emphasises that women are the decision makers; clinicians support decision making
- A change in the fetal heart rate pattern indicates a change in the fetal condition
- Fetal heart rate monitoring is only one element of fetal assessment in labour
- Risk assessment should be performed hourly in labour for all women
- When inducing or augmenting labour, monitoring and managing contraction frequency are key to reducing intrapartum hypoxia

J PAGET/ALAMY

Changes in cardiotocograph (CTG) terminology

The Guideline Committee considered it important that CTG terminology was clear and in harmony with the Avoiding Brain Injury in Childbirth initiative[7] to ensure nationwide uniformity. The GC advised the following:

- Use the terms white, amber, and red to categorise the features of the CTG rather than reassuring, non-reassuring, and abnormal, as these latter terms are often mistakenly used interchangeably with terms to describe the whole CTG
- Continue to use the terms normal, suspicious, and pathological to categorise the whole CTG
- If decelerations occur with over 50% of contractions describe them as repetitive
- Do not use the terms typical and atypical to describe variable decelerations

WHAT IS NEW IN THIS GUIDANCE

- Changed emphasis to "How is the baby?"
- Clarified cardiotocograph (CTG) categorisation
- Changed optimum contraction rate to 3-4 in 10 minutes for all women in labour
- Amended advice about meconium by ceasing to differentiate between significant and non-significant meconium and including the importance of involving women in the discussion about management
- Included new advice about fetal monitoring in the second stage of labour with specific reference to differentiating maternal and fetal heart rates
- Removed recommendations about fetal blood sampling because of limited evidence

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the guideline development group's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are in the full version of this article on bmj.com.

Risk assessment

Risk assessment forms an integral part of intrapartum care, influencing decisions about place of birth, methods of fetal monitoring, and timing and method of birth. The guidance emphasises the need to be vigilant about changes in maternal or fetal condition (such as increase in maternal temperature) with systematic assessment at least hourly in all settings to ensure that appropriate care is being offered and the holistic question "How is the baby?" is answered.

- Discuss fetal monitoring options with a woman as part of her antenatal care and document the discussions and decisions in her personalised care plan.
- Perform and document a systematic assessment of the condition of the woman and unborn baby every hour, or more frequently if there are concerns.
- Carry out a full assessment of the woman and her baby every hour. At each assessment include:
  - Maternal antenatal risk factors for fetal compromise
  - Fetal antenatal risk factors for fetal compromise
  - New or developing intrapartum risk factors
  - Progress in labour including characteristics of contractions (frequency, strength, and duration)
  - Fetal heart rate monitoring, including changes to the fetal heart rate pattern.
- Discuss with the woman any changes identified since the last review, and the implications of these changes. Include birthing companion(s) in these discussions if appropriate and if that is what the woman wants.

The committee included two recommendations to highlight:

- Fetal heart rate monitoring is a tool to provide guidance on fetal condition, and not a standalone diagnostic tool.
- The findings from monitoring need to be looked at together with the developing clinical picture for both woman and baby.

Limitations of fetal monitoring methods

The advice in this guideline relates to fetal monitoring in labour and should not be used to categorise antenatal CTG traces.

The recommended method of fetal monitoring is based on antenatal and intrapartum risk factors, with continuous CTG recommended for women whose babies are considered at high risk of compromise. The method may influence women's experiences and place of birth. There is limited quality research on which antenatal and intrapartum conditions warrant continuous CTG and whether CTG or intermittent auscultation is most effective.[9] While CTG monitoring is thought to improve recognition of fetal hypoxia, it has a high false positive rate and increases unnecessary interventions.[10]

- Explain to women that if there are no identified risk factors for fetal compromise, there is a risk of increased interventions with continuous CTG monitoring compared with intermittent auscultation, which may outweigh the benefits.
- Explain to women that continuous CTG:
  - May restrict mobility and the option to labour in water
  - A normal CTG trace indicates the baby is coping well
  - Changes to the baby's heart rate pattern during labour are common and do not necessarily cause concern. However, they may represent developing fetal compromise, so maintaining continuous CTG monitoring is advised if these occur.

Differentiating between maternal and fetal heart rate

Failure to differentiate between maternal and fetal heart rates in labour has been reported as a cause of adverse outcomes, especially during the second stage of labour. The updated guideline includes advice on actions to differentiate between the heart rates.

- If there are concerns about whether the maternal heart rate is being heard rather than the fetal heart rate, discuss with the woman the methods available to differentiate and support her decision on which method to use. Options include:
  - Fetal heart rate auscultation with a Pinard stethoscope
  - Bedside ultrasound scanning
  - Continuous maternal heart rate monitoring (using a pulse oximeter or the facility on the CTG equipment)
  - Fetal heart rate detection using a fetal scalp electrode, which is attached to the baby's head (but be aware this may detect maternal heart rate if there is no fetal heartbeat, so should always be used in conjunction with maternal heart rate monitoring)
  - Simultaneous palpation of the woman's pulse while listening to the fetal heart rate.
- If concerns about differentiation between the maternal and fetal heart rate remain, or if a fetal heart cannot be heard, obtain an urgent review by an obstetrician or senior midwife.

Rise in baseline fetal heart rate

The guideline emphasises the importance of comparing the fetal heart rate, whether using intermittent auscultation or CTG, with previous rates to identify changes and how they may reflect fetal condition. Ascertaining why a fetal heart rate has increased requires a systematic assessment—including looking for tachysystole, development of meconium or sepsis, progress in labour, and oxytocin use—when deciding whether it is safe to continue with labour.

- Review the previous fetal heart rate monitoring results, including any previous CTG traces, as part of the hourly risk assessment and in conjunction with other antenatal or intrapartum risk factors.
- Consider as an amber CTG feature an increase in baseline fetal heart rate of 20 beats/min or more from the start of labour or since the last review an hour ago.

Contractions

The summary of product characteristics for Syntocinon (synthetic oxytocin) recommends a maximum of 3-4 contractions in 10 minutes for women having labour induced or augmented with oxytocin.[11] The Guideline Committee recommended that contraction frequency is included in hourly risk assessment, with

Failure to differentiate between maternal and fetal heart rates in labour has been reported as a cause of adverse outcomes, especially in the second stage

Have a lower threshold for seeking a second opinion or assistance when assessing the fetal heart rate in the second stage of labour

action taken to keep contraction frequency at fewer than five in 10 minutes to reduce the risk of fetal hypoxia. Stakeholder comments also supported this added emphasis.

- Consider as an amber CTG feature five or more contractions in 10 minutes leading to reduced resting time between contractions or hypertonus
- If excessive contraction frequency
  - Reduce contraction frequency by reducing or stopping oxytocin if it is being used
  - Offer a tocolytic drug (a suggested regimen is subcutaneous terbutaline 0.25 mg).

Short periods of increased fetal heart rate variability

The Guideline Committee recognised that short periods of increased variability may represent worsening fetal condition.

- Increased variability refers to oscillations around the baseline fetal heart rate of more than 25 beats/min, and episodes lasting a few minutes may represent worsening fetal condition.

Assessing the fetal heart rate in the second stage of labour

The second stage of labour presents increased risks to the baby, particularly to one showing signs of fetal compromise or with risk factors such as sepsis or meconium. Furthermore, it is possible to mistake the maternal for the fetal heart rate. These new recommendations highlight areas of concern and recommended actions.

- Take into account that interpretation of CTG traces in the second stage of labour is more challenging than in the first stage of labour. Have a lower threshold for seeking a second opinion or assistance.
- Ensure the fetal heart rate is differentiated from the maternal heart rate at least once every 5 minutes
- If fetal heart rate accelerations are recorded, be aware these are most likely to be maternal pulse.
- If fetal heart rate decelerations are recorded, look for other signs of hypoxia (for example, a rise in the baseline fetal heart rate or a reduction in variability).
- Take into account that onset of hypoxia is both more common and more rapid in the active second stage of labour. Take an increase in the baseline fetal heart rate of 20 beats/min or more as a red feature in active second stage labour.
- If CTG concerns arise in the active second stage of labour, consider discouraging pushing and stopping any oxytocin infusion to allow the baby to recover, unless birth is imminent.

Character of meconium

Meconium is an intrapartum risk factor. Previously the guideline differentiated between significant and non-significant meconium, but following stakeholder comments this distinction has been removed

- When assessing risk at any time during labour, be aware that the presence of meconium:
  - Can indicate possible fetal compromise, and may lead to complications, such as meconium aspiration syndrome
  - Consider the character of the meconium as part of the overall clinical assessment, in conjunction with other antenatal or intrapartum risk factors, and discuss the option of CTG monitoring with the woman. Recognise that the type of monitoring method used is the woman's choice and support her decision.
- Be aware that meconium is more common at later gestations, but should still trigger a full risk assessment and discussion with the woman about the option of CTG monitoring.

Intravenous fluids

The Guideline Committee was aware of the continuing negative consequences (delayed intervention and maternal hyponatraemia) of the historical recommendation to commence intravenous fluids if the CTG suggested possible fetal compromise and so have strengthened the recommendation.

- Do not offer intravenous fluids to treat fetal heart rate abnormalities unless the woman is hypotensive or has signs of sepsis.

Fetal blood sampling and fetal scalp stimulation

An updated evidence review found no evidence that CTG monitoring with fetal blood sampling improved outcomes for women and babies when compared with CTG alone and indeed was associated with a reduced 5 minute Apgar score. This may be due to the fetal blood sampling procedure delaying birth. Currently an appropriately powered trial comparing fetal blood sampling and the alternative technique of fetal scalp stimulation is under way.[12]

- The Guideline Committee were unable to make a recommendation about fetal blood sampling because of limited evidence.
- If the CTG trace is suspicious with antenatal or intrapartum risk factors for fetal compromise, then consider digital fetal scalp stimulation. If this leads to an acceleration in fetal heart rate and a sustained improvement in the CTG trace, continue to monitor the fetal heart rate and clinical picture.
- Be aware that the absence of an acceleration in response to fetal scalp stimulation is a worrying sign that fetal compromise may be present, and that expediting birth may be necessary.

Implementation

Maternity units that have changed from using NICE guidance for categorising CTGs to other methods will need to provide training on these new NICE guidelines to all staff practising intrapartum care. This is to ensure a national standard methodology, as recommended in high profile safety reports,[13] is used to minimise risk. Another potential barrier to successful implementation is the current national shortage of midwives and doctors.

Competing interests: See bmj.com.

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GUIDELINES INTO PRACTICE

- Is the care that I provide in labour considering the whole clinical picture?
- Am I consistently assessing the condition of women and babies under my care?
- Am I aware of the advantages and disadvantages of different methods of fetal monitoring?

ESSENTIALS

Minor injuries: laceration repairs

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CPD READING
0.5 HOURS

Lacerations are a common presentation in urgent and emergency care settings. In this article we discuss a basic approach to wound management, when to provide antibiotic prophylaxis, and when to involve a specialist. Readers may have varied training, experience, and practice setting(s); therefore we recommend referring to local expertise, resources, and protocols when appropriate.

Initial assessment

When assessing a patient with a laceration, consider the following:

- Elicit when and how the injury occurred and manage precipitants, such as a syncope, self-harm, or substance use.
- Assess for additional injuries, paying special attention to areas not immediately visible, such as the axillas, scalp, and back.
- For upper limb injuries, determine hand dominance, occupation, and important recreational activities (eg, sports, playing musical instruments).
- Conduct a neurovascular examination for pulses, capillary refill, sensation, and motor function—especially for hand, foot, and facial injuries.
- Where appropriate, request imaging to rule out underlying fractures or foreign bodies.
- Consider taking medical photographs (document consent), or photographs on the patient's mobile device, to track wound progression.
- Note factors that may impair healing or increase infection, including peripheral vascular disease, diabetes, heavy alcohol use, smoking, steroids, immunodeficient states, extremes of age, or malnutrition.
- Ask about tetanus vaccination status and antiplatelet/anticoagulant medications. Offer tetanus prophylaxis per regional guidelines.[1-3]

WHAT YOU NEED TO KNOW

- Consider the type of injury (laceration, puncture, crush, abrasion), anatomical location, and patient characteristics when planning an approach to wound repair
- Manage precipitating factors that led to the injury (eg, syncope)
- All lacerations require irrigation prior to closure and consideration of tetanus prophylaxis, but only certain patients and laceration types require antibiotic prophylaxis

Management

If the wound is actively bleeding

Apply gauze and pressure over the wound. Most arterial bleeding stops with continuous direct digital pressure for at least 5-10 minutes (don't be tempted to check before that time has elapsed). If bleeding continues, some wounds are amenable to injection with an epinephrine-containing anaesthetic or application of a gauze soaked in tranexamic acid. If bleeding has not slowed after 15 minutes, refer to surgery urgently.

To gain rapid haemostatic control of brisk, persistent bleeds, temporarily close the skin with a continuous stitch, such as a whipstitch or baseball stitch (providing circumferential pressure to opposing skin edges) or with staples.[4] Expect a haematoma to form, which eventually tamponades bleeding vessels. Apply a pressure dressing and be sure to revise later.

Tourniquets should be reserved for life threatening haemorrhage. Any use should prompt immediate surgical consultation.

Suspected foreign bodies

Foreign bodies, most commonly in the hands or feet, may be identified using plain film x ray or ultrasound imaging. Consider taping a small metallic object such as a paper clip nearby (without obscuring), to mark the area before radiography. Bedside ultrasound has 96% sensitivity to detect virtually any foreign body, including wood, glass, metal, and plastic.[5] If clinical suspicion remains high, consider computed tomography or magnetic resonance imaging.[6] Consult a surgeon for objects that are close to key neurovascular structures, or if removal is unsuccessful.

Which wounds should not be repaired?

Primary wound closure means closing the wound within 12-24 hours of injury, while delayed primary closure involves removing packing after four or five days (in theory, when bacteria have drained from the wound) followed by wound closure. Healing by secondary

Box 1 | Wounds appropriate for healing by secondary intention[7]

- Wound >12 hours old (except face)
- Heavily contaminated
- Puncture wound
- Most bite wounds. Never close human or animal bites, with a few exceptions, such as facial or gaping wounds. Discuss these with a surgical specialist
- High pressure injection injuries (require urgent operative exploration)

a

Supraorbital and supratrochlear nerve block

Landmark: Supraorbital notch, located on orbital rim, aligning just medial to midline pupil when looking straight ahead

Approach: With needle pointing medially, start just lateral to the notch, inject bleb, advance medially along orbital rim approx. 2 cm while injecting 2-3 mL of anaesthetic

Infraorbital nerve block

Landmark: Roughly 1 cm below inferior orbital rim, aligning below the midline pupil when looking straight ahead

Approach (external): At the landmark, advance through skin and muscle tissues, deposit 2-3 mL of anaesthetic

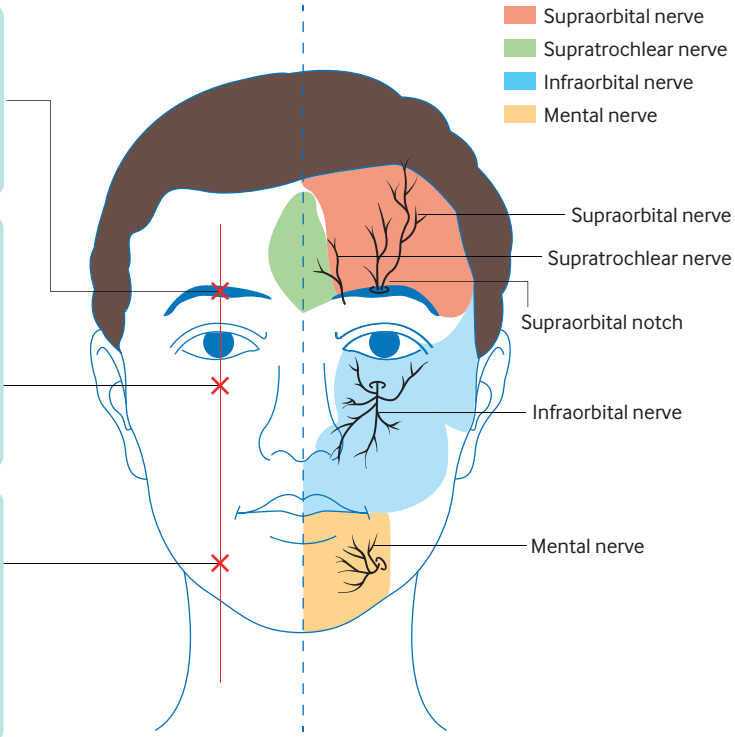
Approach (intra-oral): Insert needle roughly 2 cm above the gingival reflection at the upper second pre-molar (bicuspid) tooth; advance 2-3 cm towards the infraorbital nerve, deposit 2-3 mL anaesthetic

Submandibular nerve block

Landmark: roughly 1 cm below and 1 cm anterior to the 2nd premolar, aligning just medially to the pupil when looking straight ahead

Approach (external): at the landmark, advance through skin and muscle tissues, deposit 2-3 mL of anaesthetic

Approach (intra-oral): at the anterior cusp of the 2nd premolar at the gingival reflection, advance towards the landmark, deposit 2-3 mL of anaesthetic



Tips:

- Hold finger over landmark and aim for finger (except if approaching from directly at the landmark)
- Deposit anaesthetic adjacent to (not within) the foramen
- Massage the area of anaesthetic deposition for about 10 seconds afterwards to ensure diffusion across tissues
- For supraorbital blocks: hold finger along orbital rim to prevent ballooning of anaesthetic into orbit
- For intra-oral approaches: consider first anaesthetizing the gingiva using a cotton swab soaked with anaesthetic. Use a gauze pad on the lip for better grip.

b

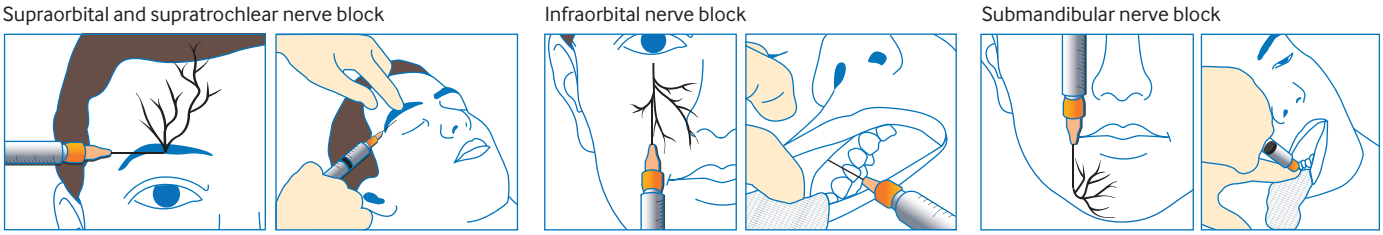


Fig 1 | Anatomy, landmarks and methods (a) and techniques for indirect approaches (b) to regional anaesthesia of the face

intention leaves the wound open to heal from the base upwards.

In general, wounds not closed primarily have a higher risk of hypertrophic scarring, and wounds outside the primary closure window of 12-24 hours have a higher risk of infection. Allowing healing by secondary intention (see below) can reduce the risk of infection associated with delayed primary closure (box 1). To prevent infection, small (<2 cm) wounds presenting after 12 to 24 hours can be left to heal by secondary intention. The exact window within which to close a wound to prevent infection remains unclear, despite the findings of a recent systematic review.[8] This study reports older age, diabetes, foreign body presence, and non-face location as important risk factors for infection—independent of how old the wound was before closure.

Facial lacerations may be closed with primary closure to improve cosmesis, even if presenting delayed (as long as the wound has not yet healed). It is reasonable to first discuss these cases with a surgeon. Lacerations with underlying fracture (open fractures) require antibiotics and possible washout in the operating room.[9]

Healing by secondary intention is performed as follows: apply topical antimicrobial ointment and a non-stick dressing (such as polymyxin B ointment, paraffin gauze, dry gauze, then rolled gauze to secure), followed by daily dressing changes until the wound heals "bottom up." With adequate teaching, most patients can manage care independently.

Closing the wound

Anaesthesia

Anaesthetic options to control pain include topical preparations such as LET (lidocaine, epinephrine, tetracaine), infiltration with local anaesthetic with or without epinephrine, and regional nerve blocks. Regional

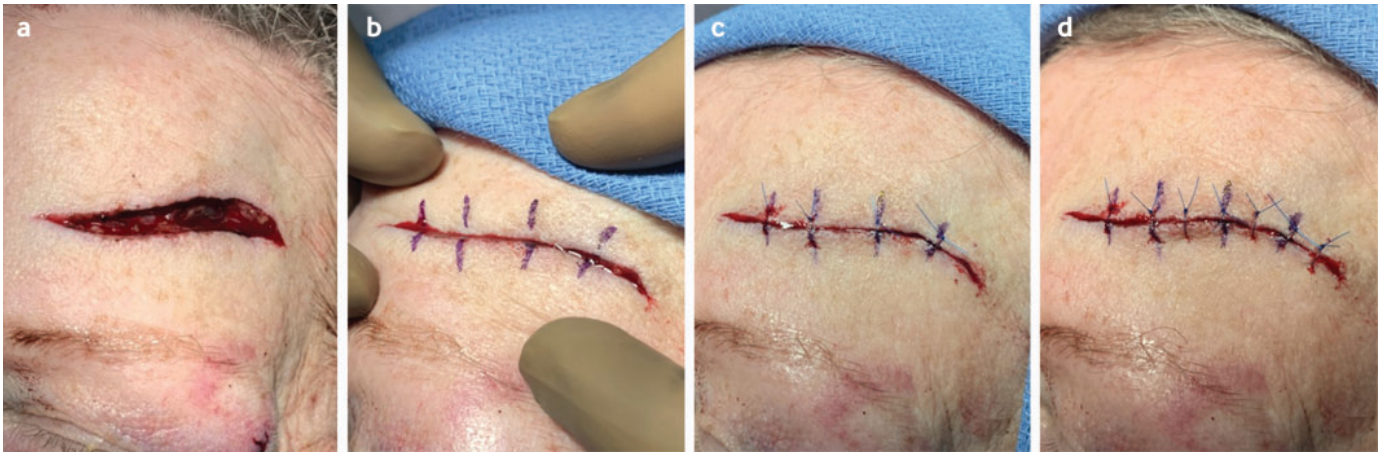


Fig 2 | Laceration repair approximation technique. (a) A gaping laceration, following anaesthesia with topical LET. (b) The wound is gently squeezed so skin edges realign and a skin marker draws lines on opposing edges. (c) Using an absorbable suture, the deep tissues were sutured at 2-3 cm intervals (not shown); next, the wound margins are brought together with simple interrupted sutures using 5-0 Prolene at the cross marks. (d) Repaired lacerations with nicely opposed wound edges

nerve blocks provide excellent anaesthesia to the face and can be used for facial and oral injuries (fig 1).

Doses of common local anaesthetics are outlined elsewhere.[4 10] Bupivacaine has a long anaesthetic effect, but when it wears off, pain returns much sooner than touch or pressure (unlike lidocaine, where all three sensations return at once), so warn patients about this.

Traditional teaching is to avoid epinephrine in the distal digits, nose, ears, and penis, however more recent studies, including a series of over 3000 consecutive cases, support the safety of lidocaine with epinephrine injection for ring blocks to the proximal or middle phalanx.[11 12] Accidental ischaemia can be reversed with phentolamine injected to the ischaemic area.[13] Useful techniques to minimise pain on injection are given in box 2.

Wound preparation

Once anesthetised, copiously irrigate the wound under pressure using sterile saline or potable tap water.[15 16]

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

A patient with a laceration requiring sutures was interviewed about their experience. As a result, patient-specific care instructions were added to this article.

Box 2 | Techniques to minimise pain of injection[14]

- Buffer the solution (10 mL of 1% lidocaine with or without epinephrine, combined with 1 mL of 8.4% sodium bicarbonate)
- Warm the solution to room temperature
- Use the smallest possible needle (we recommend 27 gauge)
- Inject slowly through the wound edges
- Use counter-stimulation (eg, simultaneously stroking an area of unaffected skin nearby)
- Use distraction techniques

We recommend creating a moderate pressure irrigation system using a blunt needle to poke three holes, close together, in the top or side of a flat topped 1 L bottle of saline or water. Alternatively, use a 35 mL syringe attached to an 18 Ga angiocatheter. It may be possible to bring the patient to the sink for irrigation. Infection rates with pulsatile versus continuous irrigation are similar.[15] Shaving or clipping hair does not lower infection rates[17] and is not recommended as routine practice.

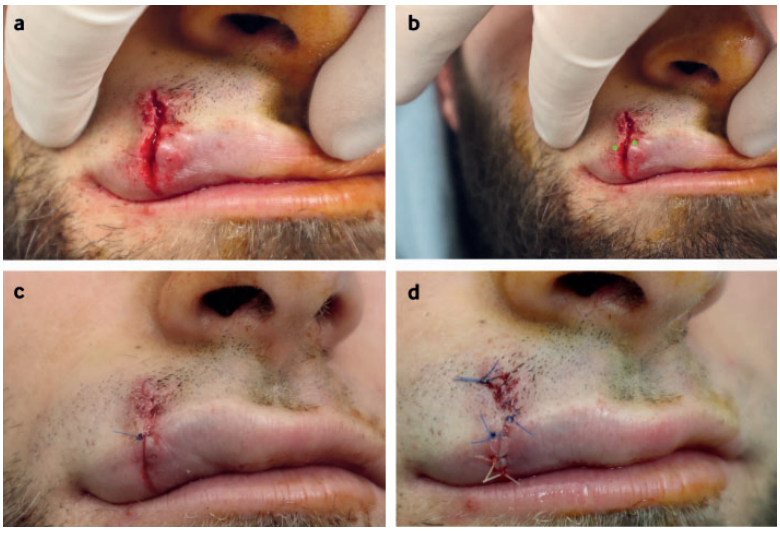


Fig 3 | Lip laceration with repair. (a) Original wound with lip laceration. (b) Marking of white roll/vermillion border for approximation. (c) Initial suture of vermillion border. (d) Lip repaired with Prolene for white lip, absorbable suture for red lip

Wound repair

Squeeze together opposing ends of the laceration to visualise where the tissues re-approximate (fig 2). Sutures can be used to repair all lacerations. Try using simple interrupted sutures to approximate tissues at a few key spots (these can later be revised, especially if deep sutures are required).

Consider staples for wounds to hair bearing areas, or large wounds that require rapid closure to permit management of more life threatening injuries.[4-18] Consider skin glue for small non-gaping lacerations: hold wound edges in apposition until glue sets (approximately 30 seconds).[19] Use extreme caution gluing around eyes and ears. Errors in application may be remedied using petroleum jelly or acetone.[20] For gaping lacerations or wounds under tension, use deep dermal sutures and/or undermining to reduce tensile forces, thereby lessening scarring and dehiscence.[18]

Sensitive locations

The following are general suggestions for nuanced management of certain wounds. In practice, follow locally available expertise, equipment, and protocols.

Facial and oral injuries

- Where expertise and equipment are available, perform an eye examination, including visual acuity, intraocular pressure, and slit lamp with fluorescein. Otherwise refer to ophthalmology.
- Non-gaping lacerations near the eye can be carefully glued and reinforced with adhesive bandages,[7] or absorbable 5-0 or 6-0 sutures may be used.
- Tongue lacerations >1 cm require suturing. We suggest anaesthetising the tongue with a "lidocaine lollypop": place a dollop of viscous lidocaine (2% to 5%) on a tongue depressor; ask the patient to hold it over the area until the lidocaine melts off.
- Lip lacerations require careful apposition for cosmesis. Place the first stitch across the vermillion border[7] to create perfect realignment (fig 3). We recommend 5-0 or 6-0 non-absorbable synthetic monofilament (eg, Prolene, Ethilon) for most repairs. Absorbable sutures obviate removal, but they are inflammatory and, in our experience, carry an increased risk of prolonged erythema and worsened scarring.

Scalp

- Bleeding from scalp lacerations typically stops after 15 minutes of constant manual pressure. Brisk bleeds can be temporarily closed using staples or a running whipstitch.
- Deep lacerations with gaping of the galea require the galeal layer to be closed.[21] Use deep absorbable sutures (eg, 3-0 or 4-0 Vicryl)—regardless of the method of skin closure—or, if suturing the skin, take deep bites that include the galea.[7]

Hands and feet

- Carefully examine hands and feet for tendon, nerve, and vascular involvement. Document sensation prior to anaesthetising.
- Test all flexor and extensor function prior to irrigation and repair.
- Consider using peripheral nerve blocks as these provide excellent anaesthesia to the foot.

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EDUCATION INTO PRACTICE

- On what occasions do you consider using regional nerve blocks for facial lacerations?
- Which wounds can heal by secondary intention?
- Which wounds require antibiotic prophylaxis?

COMPLEX WOUNDS THAT REQUIRE A SURGICAL SPECIALIST

- Amputations
- Unilateral excess tissue at the end of a wound ("dog ears")
- V shaped lacerations
- Crush injury >5 cm or with evidence of skin necrosis
- Bite wounds (refer to practice guidelines for wounds that should not be closed and which require prophylactic antibiotics)
- High pressure injection injuries (injection of substance under high pressure—such as from a paint sprayer, fuel injector, or pressure washer—into the deeper tissues). Wounds often look benign, but these are digit or limb threatening emergencies
- Through-and-through buccal lacerations (involving all layers of the cheek)
- Ear lacerations
- Haematoma overlying cartilage (nasal septum or pinna of the ear)
- Foreign bodies that cannot be removed by general practitioner or with signs of functional or neurovascular compromise
- Open fracture, tendon, nerve involvement, or retained foreign body
- Vascular compromise
- Suspected facial nerve injuries
- Complex peri-orbital lacerations (full thickness eyelid laceration, involvement of the lid margin or medial canthus, proximity to the lacrimal duct or sac (inferomedially), suspected globe injury including corneal abrasion, or corneal foreign body)[22]

WOUND CARE GUIDANCE

- Remove dressing after 24 to 48 hours; instruct the patient to apply petroleum based ointment twice daily thereafter.
- Advise the patient to
  - Wait 48 hours before allowing water to run over the wound (showering), to allow scab formation to complete and offer a partially protective barrier against infection
  - Wait three weeks before soaking (eg, swimming pool or hot tub), to allow the skin barrier to fully reform
  - Keep wound clean; daily gentle washing with mild soap and water is encouraged, but scrubbing is not necessary and may inadvertently remove a scab. If the wound is obviously dirty, allow water to run over it to soften the wound, then very gently remove dirt using finger pads (not fingernails) or a clean cloth
  - Limit scarring and hyperpigmentation by
    - Avoiding exposure of the wound to sunlight
    - Using sunscreen (once the scab falls off)
    - Applying vitamin E serum or topical silicone (gel or sheet bandage) may help, though evidence is not robust[25]
- Consider whether antibiotics are indicated (see box below and consult local guidelines)
- Remove sutures after 10-14 days, except for those on the face (5-7 days) and areas of high tension (over joints, back, scalp: 14-21 days).
- Advise the patient to
  - Return to care if they notice signs of infection: spreading redness, warmth, increasing pain at the site, purulent drainage at the wound site; or systemic symptoms including malaise, fever, and chills
  - Use non-opiate analgesia as needed
  - Elevate the wound to reduce swelling and pain
  - Return to activity, sport, or work guided by pain.

WOUNDS THAT MAY REQUIRE ANTIBIOTIC PROPHYLAXIS[27]

- Crush wounds*
- Puncture wounds*
- Bite wounds
- Through-and-through oral lacerations*
- Gunshot wounds
- Open fractures
- Grossly contaminated wounds
- Immunocompromised patients
- Areas with vascular or lymphatic compromise
- Proximity to a joint (suspicious for an open joint)
- If performing delayed primary closure*

*areas of controversy. In the interest of antibiotic stewardship, we recommend observation and initiation of antibiotics only if infection develops

CASE REVIEW A reddish brown plaque on the earlobe

A man in his 50s presented to the dermatology clinic with an eight year history of a reddish brown plaque on his left earlobe. The plaque had previously been attributed to discoid lupus erythematosus (DLE), and the patient had received several treatments without improvement. He had no systemic symptoms, trauma history, BCG vaccination, or history of systemic tuberculosis.

Examination found a well defined infiltrated erythematous plaque with overlying scale crusts and scarring of the ear lobe (figure). The concha of the ear was unaffected, and the patient had no lesions elsewhere. He had no regional lymphadenopathy.

Laboratory investigations, including complete blood count, metabolic panel, anti-nuclear antibody, interferon γ release assay (IGRA), and HIV antibody were unremarkable. Skin biopsy was taken for histopathology and culture analysis. Haematoxylin-eosin stain showed multiple epithelial cell granulomas with lymphocyte infiltration through the entire dermis, with no caseous necrosis, which was highly suggestive of tuberculoid granuloma. Acid fast bacilli (AFB) stain and fungal culture were negative. Tissue polymerase chain reaction (PCR) was negative for *Mycobacterium tuberculosis* (MTB). To assess for the presence of endogenous tuberculosis infection, computed tomography (CT) imaging of the chest and ultrasound of the abdomen and lymph nodes were performed and showed no abnormalities.

A well defined infiltrated erythematous plaque with overlying scale crusts and scarring of the ear lobe

1 What is the most likely diagnosis?
2 What are the differential diagnoses?
3 What further investigations are required?

Submitted by Hu Honghua, Ji Shunxian, and Liu Lunfei

Patient consent obtained.

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answers

CASE REVIEW **A reddish brown plaque on the earlobe**

1 What is the most likely diagnosis?

Lupus vulgaris.

Lupus vulgaris is a chronic and progressive paucibacillary form of cutaneous tuberculosis (CTB) that typically presents as slow growing, asymptomatic, scaly, crusted, reddish brown infiltrative plaques with scarring and central atrophy. CTB is an uncommon form of indolent extrapulmonary MTB infection, and has a variety of clinical features. MTB causes lupus vulgaris through contiguous, haematogenous, or lymphatic routes from an endogenous tuberculosis focus or through exogenous inoculation routes such as acupuncture, tattooing, injection, or BCG vaccination.

2 What are the differential diagnoses?

Differential diagnoses of an infiltrating earlobe plaque include DLE, granuloma annulare, lichen simplex chronicus, psoriasis, leprosy, cutaneous leishmaniasis, tertiary syphilis, non-tuberculous mycobacterial infection, deep fungal infection, sarcoidosis, and squamous cell carcinoma. Absence of involvement of the concha rules out DLE.

3 What further investigations are required?

Investigations include histopathology, AFB stain, mycobacterial culture, and PCR of a skin biopsy sample. Histopathology, AFB stain, and culture should be performed first and concurrently. Histopathology is not a confirmatory test but has diagnostic value. The results often show epithelioid cell granulomas without caseous necrosis, and AFB stain is usually negative. In cases of granulomatous inflammation with negative AFB stain, PCR of histological samples can be used for rapid diagnosis, but its sensitivity is variable. A positive result of the tuberculin skin test (TST) and IGRA indicate previous exposure to tuberculosis; IGRA has a higher specificity. However, a negative result from TST or IGRA does not rule out active tuberculosis. In addition, CT imaging of the chest and abdomen are required to determine any systemic involvement.

LEARNING POINTS

- Consider lupus vulgaris if a patient has a reddish brown scaly and crusted plaque with scarring and central atrophy on the earlobe, but without involvement of the concha.
- In lupus vulgaris, AFB stain is usually negative.
- Patients with lupus vulgaris should be investigated for systemic tuberculosis.

PATIENT OUTCOME

See bmj.com.

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LEARNING MODULE

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MINERVA

An enlarging irreducible groin lump

This is a painless lump in the right groin of a man in his 80s. The lesion had progressively enlarged over 12 months, had eroded through the skin, and was irreducible. Two years earlier the patient had received neoadjuvant chemoradiotherapy and underwent surgical resection of a locally advanced adenocarcinoma of the rectum but declined postoperative surveillance.

The patient's serum carcinoembryonic antigen level was high (880 µg/L; normal range 0-2.5 µg/L). Computed tomography scan confirmed the diagnosis of inguinal lymph node metastases from a locally recurrent malignancy that had involved the pelvic wall and had also spread to the liver and lungs.

Inguinal lymph nodes are not regional for rectal cancer but can be affected if the tumour invades the anal canal or the pelvic sidewall, as occurred in this patient. The patient received supportive management for symptom relief. Malignancy should be included in the differential diagnosis of a firm groin lump.

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If you would like to write a Minerva picture case, please see our author guidelines at bit.ly/29HCBAL and submit online at bit.ly/29yyGSx

Faecal transplantation for c difficile

A randomised trial of faecal microbiota transplantation for the treatment of a first or second infection with *Clostridioides difficile* was stopped early after an interim analysis. The primary outcome, resolution of diarrhoea at week eight, had been achieved in 19 of 21 patients in the faecal microbiota transplantation group compared with only seven of 21 patients in the placebo group. All patients had previously been treated with vancomycin for 10 days (*Lancet Gastroenterol Hepatol* doi:10.1016/S2468-1253(22)00276-X).

Asymptomatic orthostatic hypotension

Orthostatic hypotension, defined as a drop in systolic blood pressure of ≥ 20 mm Hg or in diastolic pressure of ≥ 10 mm Hg after standing, affected more than one in 10 participants in the Irish Longitudinal Study on Ageing. Most were asymptomatic, and feelings of dizziness or unsteadiness after standing didn't correlate with the size of the fall in pressure. Participants with asymptomatic orthostatic hypotension had double the risk of unexplained falls during six years of follow-up (*Age Ageing* doi:10.1093/ageing/afac295).

What sort of physical activity?

Brief bursts of vigorous physical activity as part of everyday life may be as beneficial as exercise deliberately taken in leisure time. Accelerometry data from 25 000 participants in the UK Biobank study who said they never took regular exercise finds that those who engaged in two or three short bouts of vigorous activity each day had a substantially diminished mortality from all causes, cancer, and cardiovascular disease (www.nature.com/articles/s41591-022-02100-x).

Stepping down

Many readers will recall a boss who was reluctant to retire or who stayed in their job too long. It's a selfish misjudgment that damages the future of the team and the prospects of its junior members. Astrophysicist Thomas Zurbuchen, who until 2023 led NASA's Science Mission Directorate, explains why it was time for him to resign in a piece in *Nature*. As he points out, knowing when to leave a post is an essential leadership skill (www.nature.com/articles/d41586-022-04475-w).

Fetal exposure to anti-epileptic drugs

Academic performance, judged by scores in examinationsa at the age of 16, is negatively affected by fetal exposure to carbamazepine, according to a longitudinal study from Denmark that identified exposed children from maternal prescription records. A similar association was found for fetal exposure to valproate but not for exposure to lamotrigine (*Neurology* doi:10.1212/WNL.0000000000201529).

Bursts of vigorous physical activity as part of everyday life may be as beneficial as organised exercise

Stress and risk of stroke

Psychosocial stress is a risk factor for stroke, according to a large international case-control study. High levels of self-reported stress, either at home or at work, roughly doubled the risk of acute stroke. In contrast, a higher locus of control was associated with a lower risk. Locus of control is the degree to which people believe that they, as opposed to external forces, can influence the outcome of events in their lives (*JAMA Netw Open* doi:10.1001/jamanetworkopen.2022.44836).

Characteristics of swearing

A cross-linguistic analysis finds that swear words, which occur in all languages except Esperanto, have identifiable phonetic characteristics. In particular, the presence of an approximant in a word makes it less likely to be an expletive. Approximants are speech sounds, such as the r in red, the w in war, and the l in love, produced when the articulatory surfaces of the vocal apparatus are close but not close enough to induce turbulent airflow. Sanitised versions of English swear words, for example, darn instead of damn, contain more approximants than the original (*Psychon Bull Rev* doi:10.3758/s13423-022-02202-0).

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