BREAST SURGERY

BREAST H+E

HPS	**General symptoms**	• **Fatigue/lethargy "***tumour sucks up your energy – proliferate, angiogenesis, metastases"* • **Unintentional rapid Weight loss [***e.g. 10kg/2mths***] /loss of appetite ➔ cachexia** (NB: ovarian cancer = weight gain) • **Prolonged Night sweats & febrile** (Esp. unresolved infections e.g. URT) • **Pain** = sustained gnawing pain that wakes you up at night ➔ *Tumour may be compressing other structures*	***Performance Status "ECOG scale"*** • 0 = NORMAL • 1 = light work • 2 = out of bed > half day, self caring • 3 = in bed/chair > half day, minimal self care • 4 = confined to bed/chair, totally disabled • 5 = dead ECOG 4 **Zero response** to systemic anti-cancer
	Risk factors	• **Personal**: Dense breast tissue + OLDER age, Family Hx of breast cancer in 1st degree relatives • **Menses: Early menarche**, (<12), **late birth** (>30) **nullparity, late menopause** (> 55) • **Lifestyle**: **obesity, overweight after menopause, alcoholic, sedentary** • **Medical**: HRT post menopause, Radiation therapy, previous Dx or atypical hyperplasia (e.g. fibroadenomas) **For men**: • **Older age → Klinefelter → Family Hx** = 1st deg relatives with BRCA2 (esp. those diagnosed < 40y.o.) ○ *NB: 3/4 of patient with breast cancer have NO known risk factors:*	

	Assoc. symptoms [MNB]	• **Time course**:
		  ○ **When 1st noticed?**
		  ○ **change in size/texture**
		• **Menstrual cycle ➔ early menarche (<12)** | late menopause (>55) | **late pregnancy** *OR* **NO pregnancy (nullparity)**
		• **Does lump change with menstrual cycle?:**
		  ○ **Yes**: hormone dependent (treatable)
		  ○ **No**: grows independently (dangerous)
		• **Nipple discharge ➔** If **clear or blood stained** = **PATHOLOGICAL RED FLAG!**
		• **Breastfeeding Hx➔** Difficulty? Short-time? (possible **mastitis**)
		• **Metastatic symptoms →** bone pain, headache, palpable lymph nodes
			

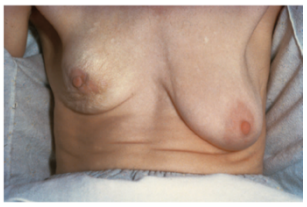
	If men	• *Symmetric* bilateral enlargement ➔ **Gynecomastia** (due to hormone or medications – spironolactone) • *Asymmetric* unilateral enlargement ➔ **malignancy** (**100x less likely than females since less breast tissue in men**)	
PMHx	**Current Conditions**	• **Major**: Obesity, early menarche (<12), late menopause (> 55), late 1st pregnancy • **Previous breast cancer Hx or atypical hyperplasia (ductal or lobular) ➔** significantly increases risk ○ **PREVIOUS BREAST IMPLANTS** • ASK ABOUT PREVIOUS Mx → RT, chemo, lumpectomy, mastectomy +oncologist **Also check for:** • **CVD:** can have certain type of chemotherapy • **DVT:** can they have tamoxifen • **ILD /lung transplant:** can they have immunotherapy? • **ECOG:** should they have Rx at all?	
	Medications & Allergies	• HRT (estrogen) post-menopausal • Spironolactone in men • Are they allergies or just side effects?	
	Surgeries/ Treatments	• Previous breast surgery, biopsies, cyst aspirations, recurrent abscesses (granulomatous mastitis) • Radiation therapy for Hodgkin's lymphoma • Breast implants (if any)	
	Tests	• **Mammograms** (esp. > 50y.o - last test & result → completed every 2 years from 50-74 y.o.) • **Genetic testing** (BRCA1/2) → strong risk of breast/ovarian cancer	
Social Hx	**Occupation**	• Obseity + Night-shift worker (increases risk of BC)	
	Smoking * alcohol	• Increased cancer risk	
Family Hx	• **Family Hx of breast/ovarian cancer** (and at what age?) in **1st degree relatives** • **Lynch Syndrome (MMR), Li Fraumelli (p53)** • **BRCA 1 mutation ➔ BIGGEST RISK FACTOR ➔** affects medical and surgical treatment		

DDx breast pain (mastalgia)

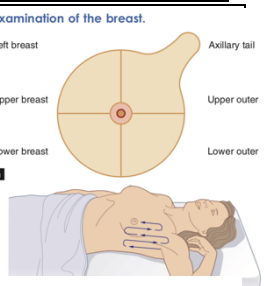
Types	Define	Assoc.	Ix	Mx
Cyclical mastalgia	➢ Occurs specific times in menstrual cycle ➢ More common	➢ Usu. 2 weeks before luteal phase ➢ PMS symptoms (low mood, bloating, headache, fatigue)	Breast pain diary: Further Ix to exclude: 1. Cancer 2. Infection (mastitis) 3. Pregnancy (B-HCG urine)	1. Supportive bra 2. NSAID 3. Avoid caffeine 4. Heat packs 5. Hormonal Rx (tamoxifen) under specialist
Non-cyclical mastalgia	➢ More common in 40-50yo women	Caused by: ➢ Infection (mastitis) ➢ Pregnancy ➢ Medication (HRT, COCP)		

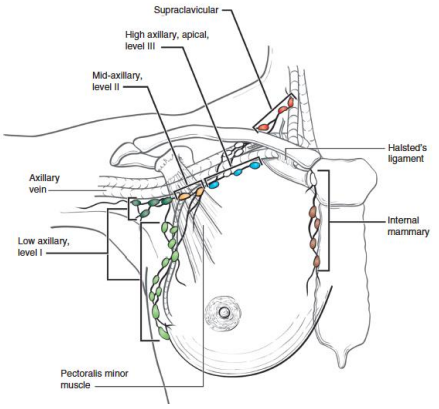
Breast Examination: (3min /breast) = 90% specificity!!

Intro ***[Examine breast after period = less glands]***	• *Introduce yourself + Explain rationale* • *Offer a **chaperone*** • *Adequate exposure ➔ allow patient to undress in private (close curtains) ➔ DO NOT assist with this unless asked to!*	
General inspection	• ***Environmental**: aids, photos, flowers* • ***Family dynamics (relos)*** • ***Beliefs (e.g.** bling, religious emblems, tattoos = increased risk of BBV)* • ***Demeanour, Mobility (gait), symmetry & cachexia***	
Position	***1. Hands on hips facing you*** ***2. Lying supine + arms above head***	
Inspect	***Breast***	• ***Any Asymmetry** esp. if new* • ***Scars*** • ***Rash & bruising (**previous biopsy?)*
	Skin	• ***Unilateral visible Veins** (cancer)* • ***Erythema** (mastitis)* • ***Dimpling and peau o'range skin** due to pitted sweat glands ➔ **INFLAMMATORY BREAST CANCER***
	Nipple	• ***Retracted** (cancer/fibrosis but may be normal long-standing)* • ***Inflamed scaly rash, or ulceration (Paget's disease of breast)*** • ***Surrounding plaque** (contact dermatitis or irritation) → if asymmetrical (Paget's disease of breast)*
	Raise arm above head	• ***Check for mass** in axilla & supraclavicular LNs* • ***Lower arms slowly ➔** nipple shifting or fixed mass distortion*

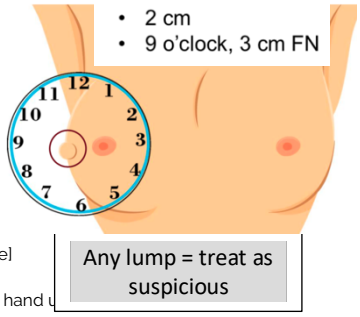


Carcinoma of the right breast, showing elevation of the breast, dimpling of the skin and retraction of the nipple





Palpate & evaluate	**1. Position**	1. Ask patient to squeeze hips with hands 2. **START WITH NORMAL BREAST** 3. **LIGHT then DEEP** Palpation with pads of 2nd, 3rd and 4th fingers parallel to contour of breast (may need to support the breast with other hand) [KEEP FINGERS FLAT!] a. Note location & distance b. Massage in circular motion c. Stay on same side to palpate both breasts 4. **Lymph nodes [Hold arm like shaking entire arm to reveal axilla] "***rest your arm* **[BIGGEST PROGNOSTIC INDICATOR FOR BC]** a. Against chest wall b. High axilla then slide down arm c. Behind d. Front e. **Supraclavicular** [shrug shoulders] f. **Cervical LN** [turn neck towards one side → feel any lumps on opposite] 5. Ask patient to lie down **supine** → place hand above and behind head a. Palpate **retro-areolar space** (i.e. find any lumps behind nipple) ➔ (left hand flatten breast) b. Repeat ➔ helps to identify tethering and any lumps behind breast esp. for G cups c. *for women with breast implants → lie **supine** and keep ipsilateral arm down at side*
	2. Size/shape/ consistency	• **Hard, irregular nodule** = carcinoma • **Firm, smooth, "mobile", regular nodule** = fibroadenoma (esp. young women)
	3. Tenderness	**Non-tender breast lump**: • Cyst • Carcinoma • Fibrocystic disease • Fibro-adenoma (*benign highly mobile breast mouse*) **Tender breast lump**: • Cyst • Breast abscess • Fibro-adenosis • Costal cartilage chondritis • Inflammatory breast cancer **Uncommon cause**: • **Fat necrosis (post-trauma)** • **Trauma** • **Galactocele** (cysts) • **Duct papilloma** (neoplasms) • **Granulomatous mastitis** (inflammation mimics breast cancer)
	4. Fixation	Fixed to wall = advanced carcinoma



Additional steps	**Assess the neck** ➢ Cervical and supraclavicular LN ➢ Signs of mets – lungs, liver and bones	**Triple test assessment:** ➢ Clinical assessment (H+E) ➢ Imaging (USS, MMG) ➢ Biopsy (FNA or core biopsy)

DDx breast lumps

	Breast cancer	Fibroadenoma	Fibrocystic changes	Breast cysts	Fat necrosis	Lipoma	Galactocele	Phyllodes Tumour
Details	Hard irregular painless fixed mass tethered to wall	Painless, smooth, well-defined firm mobile mass	Irregular hard or cystic mass with breast tenderness	Smooth well-circumscribed mobile	Painless firm, irregular fixed mass	Soft painless mobile mass	Firm, mobile, painless lump under areola	Rare CT stromal large and fast growing tumour
Assoc. Sx	➢ Nipple retraction ➢ Skin dimpling or oedema (paeu d'orange)	Benign	Fluctuate in size with menstrual cycle	Fluctuate in size with menstrual cycle	Skin dimpling or nipple inversion	Benign tumours of adipose tissue	Breast milk filled cysts when lactiferous duct blocked	40-50yo females
Mx	• Non-urgent referral to breast oncologist • Triple assessment	Watch and wait	➢ Supportive bra ➢ NSAID ➢ Avoid caffeine ➢ Heat packs ➢ Hormonal Rx (tamoxifen) under specialist	• Triple assessment • Rx: aspiration of cysts	Ix to exclude BC • USS/MMG • FNA or core biopsy Rx: self-resolves but surgical excision offerred	Reassurance or surgical removal	Reassurance and self-resolves	50% benign 50% borderline 25% malignant → consider chemo

BREAST CANCER

Details

- **most common cancer in the world**
- **around 1 in 8 women will develop breast cancer in their lifetime**
- **50% of breast cancers are NOT inherited**

Risk factors

- *Female (99%)*
- ***Personal Hx of cancer, fibroadenomas***
- ***↑↑ E2*** = *Obesity, Early menarche, late menopause, difficulty breastfeeding, nullparity, HRT/COCP*
- ***OLD FEMALE EX-SMOKERS w/ dense breasts***
- **Family Hx (BRCA1/2, PTEN, TP53** → Li Fraumeni syndrome (osteosarcoma in children)
- **Protective = PA + breastfeeding**

SPECIFIC HIGH RISK FACTORS:

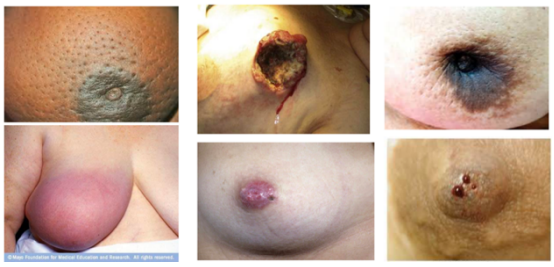
- 1ST deg relative with BC < 40yo
- 1st deg male relative
- 1st degree relative w/ bilateral BC < 50YO
- TWO 1st degree relatives with BC

Assoc. Sx

Mass	• Irregular growing hard mass (> 2cm) • Fixed to chest wall
Pain	Inflammatory breast cancer or Paget's disease of breast
Nipple	• Blood stained discharge • Nipple retraction
Skin	• Inflammatory, ulcers, rashes • Peau d'orange
LN	Palpable axillary LN, nec

Red flags for referral:

- Unexplained breast lump > 30yo
- Unilateral nipple changes > 50yo (e.g. d/c, retraction)
- Unexplained axilla lump in > 30yo
- Skin changes suggestive of BC

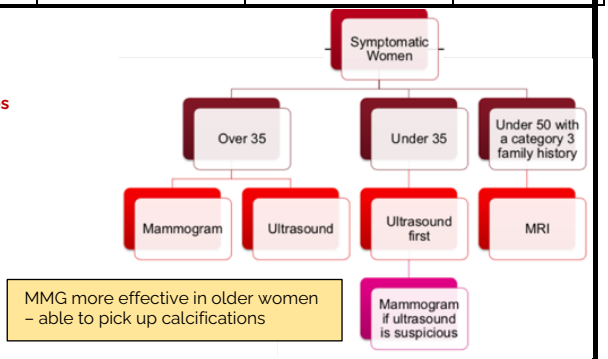


Types

DCIS	LCIS	ILC	Paget's disease	NST (non-specific type)	Inflammatory breast cancer	Male breast cancer
70-80% BC		5-10%			1-2%	1%
• **DCIS = precursor** • Hard palpable masses	• Asymptomatic Incidental finding on biopsy	• Breast lobules • Jelly-like and firm • Non-palpable mass	Like eczema (red, scaly rash) • BC involving nipple	• Invasive BC of NST • Breast ductal cells	• Peau d'orange • Swollen, itchy tender breasts • Enlarged breasts	BCRA2 > 1
LN + BLOOD		GIT, ovary, uterus			Dermal LN	
Good prognosis if fully excised and adjuvant Rx	Regular yearly MMGs	Not always visible on MMG		Seen on MMG	Unresponsive to ABx Worse prognosis	

Ix (triple test)

- **Breast cancer screening program**
- **(1) H+E plus (2) Imaging:**
  - **MMG** (specificity increase with age + detect impalpable cancers)
  - **Breast USS** = help distinguish **solid lumps** (e.g. cancer, FA) vs **cystic lumps**
- **(3) Biopsy for staging [TNM] & grading [Bloom and Richardson]**
  - **FNA** = cytology (atypical dysplasia) = *cystic lesions, FA*
  - **Core-needle** = architecture (grading, LNI, PNI, mitotic rate) → *DCIS, IDC*
- **METASTATIC TEST (2 L's and 2 B's) → lung, liver, bone, brain (DDx: melanoma)**
  - **sentinel LN biopsy (USS guided)**
  - **MRI breast + axilla (if high risk history)**
  - **Liver USS – liver mets**
  - **CT thorax, abdomen, pelvis +/- isotope bone scan for bone mets**
- **Genetic counselling and testing**
  - 1st degree relatives, siblings and offspring



MMG more effective in older women – able to pick up calcifications

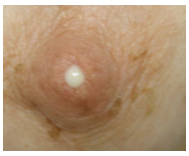
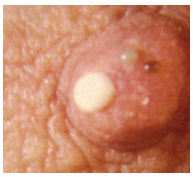
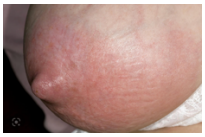
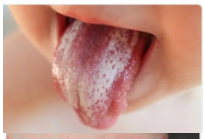
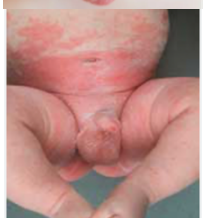
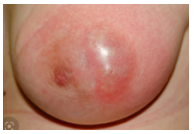
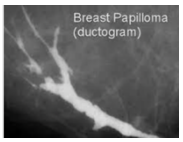
Mx

	Indication	A/E
CHEMO Most G3 (node +ve BC) • **All** triple -ve • **All** HER2 +ve	**Neoadjuvant CHEMO – BEFORE** • Downstage tumour for easier surgery **Adjuvant CHEMO - AFTER** • ER +ve (luminal A/B)	• Assess cancer's response to chemo • Fatigue, weight loss, N/V, weak
RT	• **Adjunct to lumpectomy** (**Wide local excision**)– if LN involved & extensive disease,	**AE:** skin burns and fatigue, fibrosis and shrunken breast tissue and pigmentation
HORMONE therapy **ER +ve tumours** G1, some G2 and ILC	**Tamoxifen** (**pre-meno**); →Selective oestrogen receptor modulator → block E2 receptors in breast and stimulates E2 receptors in uterus, bones	**AE:** hot flushes, VTE risk, endometrial ca. [**OP protective**[
	Aromatase Inhibitors (letrozole) (**post-meno**) – block TT to DHT conversion to stop E2 production in fat	**AE:** MSK (myalgia), decreased bone density = OP
Targeted therapy (HER 2+ve)	***Trastuzumab*** (***Herceptin***) , ***Pertuzumab*** (***Perjeta***) , ***Neratinib*** (***Nerlynx***) is a tyrosine kinase inhibitor	***Recurrence***
Surgery	**Breast conserving surgery (e.g. wide local excision) with adjuvant radiotherapy** ➢ *Partial reconstruction (using flap or fat tissue to fill gap)* ➢ *Reduction and reshaping (remove tissue and reshape both breasts to match)* **Mastectomy → immediate or delayed breast reconstruction** ➢ *Breast implants* ➢ *Flap reconstruction* **- lat dorsi, transverse RA, deep epigastric perforator**	**Chronic Lymphoedema (axillary LN excision)** ➢ Compression bandage + gentle massage ➢ Good skin care and wt loss **Implants** = hardened, leakage and shape change **Flaps** = hernias

'***Luminal cells*** = *respond to hormonal stimulation* ''***Myoepithelial cells*** = *contractile cells for lactation*

	Incidence	ER/PR	HER2	Ki67 (prol. Rate)	Prognosis
Luminal A	50%	Strong ER Expression	Negative		**Favourable**
Luminal B	20%	Weak Expression Of ER/PR	Negative	High	**Less favourable (G3)**
HER2 enriched	15%	**Often Negative**	**Positive**	High	**Often high grade (G3)**
Basal-like [triple -ve]	15%	**Negative**	**Negative**	High	**WORST PROGNOSIS + high grade (G3) [BUT highly responsive to chemo]**

Common breast DDx:

	Gynecomastia	Galactorrhea	Mammary duct ectasia	Intraductal papilloma	Lactational mastitis	Breast abscess
Details	• Enlarged glandular breast tissue in males due to XS estrogen (relative to androgen) • Mainly idiopathic but many causes	• Breast milk production not assoc. with pregnancy or BF • XS prolactin • Oxytocin = drives BM excretion	Benign dilation of large ducts causing inflammation and intermittent d/c of different colours	Warty lesion growing within a duct in breast (proliferation of epithelial cells)	Inflammation of breast tissue that may occur with or without infection Obstruction in ducts and milk accumulation	Pus within breast caused by bacterial infection ➢ Lactational ➢ Non-lactational
Risk factors	**XS estrogen** • Obesity (XS aromatase) • Testicular cancer (2%) (Leydig cell tumour) • Liver cirrhosis /failure • Hyperthyroidism • HCG secreting tumour (e.g. SCLC) **Low androgens** • Testicular def. (old age) • HPA dysfn (tumours, RT, surgery) – which ↓LH/FSH • Klinefelter • Orchitis (mumps) • Testicular damage (trauma or torsion) **Medications** ➢ Anabolic steroids ➢ Anti-psychotics (↑PrL) ➢ Digoxin ➢ Spinolactone ➢ GnRH agonist (for prostate cancer) ➢ Alcohol ➢ Marijuana	**XS prolactin causes:** • **Hyperprolactinoma** (MEN1) Micro <10mm Macro > 10mm • **Endocrine** (hypothyroidism, PCOS) • **Medications** (dopamine antag – anti-psychotics) DDx: non-milk discharge: ➢ Mammary duct ectasia ➢ Ductal papilloma ➢ Pus from breast abscess 	**Main risk factors** • Smoking • Perimenopausal women 	**Main risk factors** • 35-55 yo (but can occur at any age)	**Main risk factors** • Breastfeeding + not regularly expressing milk *Candida of nipple* • Recurrent mastitis • Post-ABx course   	**Main risk factors** • **Smoking** • **Nipple dam**age (eczema, candida infection, piercings) • **Breast disease** (affects drainage = increased infection risk) **Main causes:** • S. aureus • Streptococcal • Enterococcal • Anaerobes (bacteriodes, anaerobic streptococci) 
Assoc. Sx	➢ **True gynacomastia** vs simple adipose tissue ➢ **Palpable breast lumps** (exc. BC) ➢ **TT def**. (reduced body or pubic hair) ➢ **Liver disease** (jaundice, HM, spider naevi, ascites) ➢ **Hyperthyroid** (sweat, UWL, tachycardia)	XS PrL = ↓GnRH = ↓LH/FSH • Milk discharge • Gynacomastia in men • Low libido • ED • Amenorrhoea or irregular menses Mass effect (prolactinoma): • Headache • Bitemporal hemianopia	• Nipple d/c (white, grey or green) • Breast tenderness • Nipple retraction • Breast lump (pressure on lump)	**Usually asymptomatic:** • Nipple d/c = blood stained • Breast tenderness • Palpable lump 	*Bacterial mastitis* • Unilateral breast pain and tenderness • Warm, hot, inflamed breast • Nipple discharge • Fever *Candida of nipple* • Cracked flaky areola • Bilateral sore itchy nipples • Baby has oral thrush and nappy rash	**Fluctuant tender lump within breast** (i.e. able to move lump using pressure on palpation) • **Mastitis Sx** • Muscle aches, fatigue, fever • Sepsis signs
Ix	➢ BMI ➢ Testicular exam ➢ FBC, EUC, LFT, ➢ PrL, TFT ➢ LH/FSH and TT/E2 ➢ AFP and B-HCG (testicular cancer) ➢ Karyotyping ***Imaging*** ➢ USS, MMG ➢ Biopsy ➢ Testicular USS ➢ CXR (?SCLC)	➢ FBC, EUC, LFT, ➢ **B-HCG (exc. pregnancy)** ➢ PrL, TFT ➢ LH/FSH and TT/E2 ➢ MRI scan – for pituitary tumours	Triple assessment: • USS/MMG (**microcalcifications – key finding**) • FNA or core biopsy Additional Ix: • **Ductography** (visualise duct /w contrast) • **Nipple d/c cytology** • **Ductoscopy** (insert tiny endoscope into duct)	Triple assessment: • USS/MMG (**microcalcifications – key finding**) • FNA or core biopsy Additional Ix: • **Ductography** (visualise duct – papillomas = area that does not fill with contrast "filling effect"	Clinical assessment If infective signs consider milk sample M/C/S ***Mx: lactational mastitis*** If just blockage: **conservative Mx** ➢ Continue BF ➢ Express milk ➢ Breast massage ➢ Heat pack and warm showers ➢ NSAIDs ***If infected lact. mastitis*** ➢ **Flucloxacillin** (or erythromycin) ➢ **Fluconazole** (if candida suspected) ➢ **Topical miconazole** 2% on nipple after BF ➢ Baby = **PO miconazole gel** or nystatin for oral candida	Clinical assessment ***Non-lactational mastitis*** ➢ **Analgesia** ➢ **Co-amoxiclav** +/- metro (for anaerobes) ➢ **Rx cause** (e.g. eczema or candida) *Breast abscess:* ➢ **Refer on-call surgical team** ➢ **ABx** ➢ **USS** (exc. other pathology) ➢ **Incision and drainage** ➢ **M/C/S of drained fluid** ➢ Continue BF or express milk (not harmful to baby)
Mx	• Depends on cause (e.g stop drugs) • Self-resolves in adolescents • If healthy – watchful waiting • Unexplained rapid-onset gynaecomastia in a 30 year old male with no apparent cause may require in-depth investigations If problematic: • Tamoxifen • Surgery	**Rx cause** ➢ Dopamine agonist (e.g. bromocriptine, cabergoline) ➢ Trans-sphenoidal removal of pituitary tumour	**Reassurance (if cancer is excluded)** • Supportive bra • Warm compresses • ABx (if infection present) • Surgical excision of affected duct (microdochectomy) if affecting ADLs	• Complete surgical excision • Send tissue to pathology to identify possible atypical hyperplasia or BC		