Sultanate of Oman
Ministry of Health
The Royal Hospital
Department of Surgery

Code: SUR-TS-PRT-4-Vers.2.0

Effective Date: 09/06/2024
Target Review Date: 09/06/2026

Title: Postoperative esophagectomy pathway

Postoperative pathway – Esophagectomy POD 0

Date:

		Check
Nutrition	Keep patient NPO	
Tubes	NGT on intermittent low wall suction	
	Flush NGT with 20 cc water TID (once per shift)	
	Feeding jejunostomy to straight drainage. Flush with 20cc water once daily.	
	Drain (Jackson-Pratt or Blake) to bulb suction	
	Chest tube to under water seal (no suction)	
	Foley catheter to straight drainage	
Labs	CBC, U+E, Mg in PACU/HD/ICU	
Imaging	CXR in PACU/HD/ICU	
Nursing	Vital signs in HD: continuous telemetry, continuous O2 saturations, BP Q2 hours for 8 hours then Q4 hours.	
	Strict input and output monitoring and recording • Record chest tube output Q15 mins for 1st hour then Q30 minutes for 2nd hour then Q2 hours for 8 hours then Q8 hours • Record urine output Q1 hour for 4 hours then Q2 hours for 4 hours then Q8 hours	
	Call MD if: • HR <60 or > 100 bpm • SBP <90 • MAP <65 • SpO2 <88% or O2 requirements >5L • Temp <35*C or >38*C • UO <0.5 ml/kg/min • Chest tube output >200 ml/hour	
	Sit the patient at the edge of the bed as tolerated for maximum 30 minutes	
	Incentive spirometry 10 times Q1 hour	
	Keep mechanical thromboprophylaxis until ambulatory	
Medications	• Perform reconciliation for every patient. Hold unnecessary medications. • Give necessary medications through NGT or feeding tube if present (liquid format whenever possible).	
	Paracetamol 1g IV QID regular	
	If not on epidural/PCA: tramadol 50mg IV/SC TID regular. Consider increasing the dose to 100mg or adding morphine 5mg SC if additional pain control is required.	
	Omeprazole 40mg IV BID	
	Ondansetron 4mg IV PRN max TID. If required, increase to 8mg.	
	Epidural and PCA as per anesthesia protocol (if present).	
	Salbutamol nebs 5mg QID regular + Ipratropium bromide 250mcg QID regular If additional required or if tachycardic (avoid salbutamol): 3% saline nebs QID regular	
IV fluids	D5 ½ NS at 100 ml/hour	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient regarding enteral nutrition through the feeding jejunostomy (starting on POD 2)	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	

Postoperative pathway – Esophagectomy
POD 1

Date:

		Check
Nutrition	Keep patient NPO	
Tubes	NGT on intermittent low wall suction	
	Flush NGT with 20 cc water TID (once per shift)	
	If bile present in feeding jejunostomy bag, start 5% or 10% dextrose infusion at 10ml/hour only.	
	Drain (Jackson-Pratt or Blake) to bulb suction: MD to "milk" drain.	
	Chest tube to under water seal (no suction)	
	Foley catheter to straight drainage	
Labs	CBC, U+E, Mg	
Imaging	CXR portable	
Nursing	Continue nursing in HD	
	Vital signs in HD: continuous telemetry, continuous O2 saturations, BP Q4 hours	
	Strict input and output monitoring and recording • Chest tube output Q8 hours • Urine output Q8 hours	
	Call MD if: • HR <60 or > 100 bpm • SBP <90 • MAP <65 • SpO2 <88% or O2 requirements >5L • Temp <35*C or >38*C • UO <0.5 ml/kg/min • Chest tube output >200 ml/hour	
	Ambulate the patient three times a day	
	Sit on chair when awake	
	Incentive spirometry 10 times Q1 hour	
	Remove mechanical thromboprophylaxis if ambulatory	
Medications	• Perform reconciliation for every patient. Hold unnecessary medications. • Give necessary medications through NGT or feeding tube if present (liquid format whenever possible)	
	Paracetamol 1g IV QID regular	
	If not on epidural/PCA: tramadol 50mg IV/SC TID regular. Consider increasing the dose to 100mg or adding morphine 5mg SC if additional pain control is required.	
	Omeprazole 40mg IV BID	
	Ondansetron 4mg IV PRN max TID. If required, increase dose to 8mg.	
	If no clinical signs of bleeding, start Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 units SC BID.	
	Epidural and PCA as per anesthesia protocol (if present).	
	Salbutamol nebs 5mg QID regular + Ipratropium bromide 250mcg QID regular If additional required or if tachycardic (avoid salbutamol): 3% saline nebs QID regular	
IV fluids	D5 ½ NS at 100 ml/hour	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient regarding enteral nutrition through the feeding jejunostomy (starting on POD 2)	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	

Postoperative pathway – Esophagectomy
POD 2

Date:

		Check
Nutrition	Keep patient NPO	
Tubes	NGT on intermittent low wall suction	
	Flush NGT with 20 cc water TID (once per shift)	
	Start jejunostomy feeds at 10 ml/hour. Increase rate as per protocol to target rate.	
	Jackson-Pratt to bulb suction: MD to "milk" drain.	
	Chest tube to under water seal (no suction)	
	Remove Foley catheter	
Labs	CBC, U+E, Mg	
Imaging	CXR portable	
Nursing	Continue nursing in HD	
	Vital signs in HD: continuous telemetry, continuous O2 saturations, BP Q4 hours	
	Strict input and output monitoring and recording • Chest tube output Q8 hours • Urine output Q8 hours	
	Call MD if: • HR <60 or > 100 bpm • SBP <90 • MAP <65 • SpO2 <88% or O2 requirements >5L • Temp <35*C or >38*C • UO <0.5 ml/kg/min • Chest tube output >200 ml/hour	
	Ambulate the patient three times a day	
	Sit in chair when awake	
	Incentive spirometry 10 times Q1 hour	
	Remove mechanical thromboprophylaxis if ambulatory	
Medications	• Perform reconciliation for every patient. Hold unnecessary medications. • Give necessary medications through NGT or feeding tube if present (liquid format whenever possible).	
	Paracetamol 1g IV QID regular	
	If not on epidural/PCA: tramadol 50mg IV/SC TID regular. Consider increasing the dose to 100mg or adding morphine 5mg SC if additional pain control is required.	
	Omeprazole 40mg IV BID	
	Ondansetron 4mg IV PRN max TID. If required, increase dose to 8mg.	
	Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 units SC BID.	
	Epidural and PCA as per anesthesia protocol (if present).	
	Salbutamol nebs 5mg QID regular + Ipratropium bromide 250mcg QID regular If additional required or if tachycardic (avoid salbutamol): 3% saline nebs QID regular	
IV fluids	If on feeds, target total fluid intake (IV + feeds) = 100 ml/hr. Once on target feeds, stop IV fluids and start water flushes through jejunostomy tube 100 ml QID. Otherwise, continue D5½NS 100 ml/hr.	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient regarding enteral nutrition through jejunostomy	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	

Postoperative pathway – Esophagectomy
POD 3

Date:

		Check
Nutrition	Keep patient NPO	
Tubes	NGT on intermittent low wall suction	
	Flush NGT with 20 cc water TID (once per shift)	
	Continue enteral feeding at target rate + water flushes 100 ml Q6H. If not at target feeds, increase as per protocol. If not passing gas, keep at 20 ml/hour.	
	Jackson-Pratt to bulb suction: MD to "milk" drain	
	Chest tube to under water seal (no suction)	
Labs	CBC, U+E, Mg	
Imaging	CXR portable	
Nursing	Continue nursing in HD	
	Vital signs in HD: continuous telemetry, continuous O2 saturations, BP Q4 hours	
	Strict input and output monitoring and recording • Chest tube output Q8 hours • Urine output Q8 hours	
	Call MD if: • HR <60 or > 100 bpm • SBP <90 • MAP <65 • SpO2 <88% or O2 requirements >5L • Temp <35*C or >38*C • UO <0.5 ml/kg/min • Chest tube output >200 ml/hour	
	Ambulate the patient three times a day	
	Sit in chair when awake	
	Incentive spirometry 10 times Q1 hour	
	Remove mechanical thromboprophylaxis if ambulatory	
Medications	• Perform reconciliation for every patient. Hold unnecessary medications. • Give necessary medications through NGT or feeding tube if present (liquid format whenever possible).	
	Paracetamol 1g IV QID regular	
	If not on epidural/PCA: tramadol 50mg IV/SC TID regular. Consider increasing the dose to 100mg or adding morphine 5mg SC if additional pain control is required.	
	Omeprazole 40mg IV BID	
	Ondansetron 4mg IV PRN max TID. If required, increase dose to 8mg.	
	Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 units SC BID.	
	Epidural and PCA as per anesthesia protocol (if present)	
	Salbutamol nebs 5mg QID regular + Ipratropium bromide 250mcg QID regular If additional required or if tachycardic (avoid salbutamol): 3% saline nebs QID regular.	
IV fluids	Stop IV fluids once patient is on target feeding rate. If not on feeds, continue same IV fluids D5 ½ NS 100 ml/hour.	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient regarding enteral nutrition through the jejunostomy.	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	

Postoperative pathway – Esophagectomy
POD 4

Date:

		Check
Nutrition	Start sips of water (unless indicated by MD). If upper GI study is normal, start clear fluids.	
Tubes	Remove NGT.	
	Continue enteral feeding at target rate + water flushes 100 ml Q6H.	
	Jackson-Pratt to bulb suction: MD to "milk" drain	
	Chest tube to under water seal (no suction)	
Labs	CBC, U+E, Mg	
Imaging	CXR portable	
	Barium swallow (unless indicated by MD)	
Nursing	Continue nursing in HD	
	Vital signs in HD: continuous telemetry, continuous O2 saturations, BP Q4 hours	
	Strict input and output monitoring and recording • Chest tube output Q8 hours • Urine output Q8 hours	
	Call MD if: • HR <60 or > 100 bpm • SBP <90 • MAP <65 • SpO2 <88% or O2 requirements >5L • Temp <35*C or >38*C • UO <0.5 ml/kg/min • Chest tube output >200 ml/hour	
	Ambulate the patient three times a day	
	Sit in chair when awake	
	Incentive spirometry 10 times Q1 hour	
	Remove mechanical thromboprophylaxis if ambulatory	
Medications	• Perform reconciliation for every patient. Hold unnecessary medications.	
	Paracetamol 1g IV QID regular	
	If not on epidural/PCA: tramadol 50mg IV/SC TID regular. Consider increasing the dose to 100mg or adding morphine 5mg SC if additional pain control is required.	
	Omeprazole 40mg IV BID	
	Ondansetron 4mg IV PRN max TID. If required, increase dose to 8mg.	
	Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 units SC BID.	
	Wean the patient off epidural or PCA. Initiate 6-hour epidural stop test while supplementing with PO opioids. If tolerated, remove epidural catheter.	
	Salbutamol nebs 5mg QID regular + Ipratropium bromide 250mcg QID regular If additional required or if tachycardic (avoid salbutamol): 3% saline nebs QID regular	
IV fluids	Stop IV fluids once patient is on target feeding rate. If not on feeds, continue same IV fluids D5 ½ NS 100 ml/hour.	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient regarding enteral nutrition through the jejunostomy.	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	

Postoperative pathway – Esophagectomy
POD 5

Date:

		Check
Nutrition	Clear fluid diet	
Tubes	Continue enteral feeding at target rate + water flushes 100 ml Q6H	
	Jackson-Pratt to bulb suction: MD to "milk" drain	
	Chest tube to under water seal (no suction)	
Labs	CBC, U+E, Mg	
Imaging	CXR portable	
	Barium swallow, if not done on POD 4 (unless indicated my MD)	
Nursing	Continue nursing in HD	
	Vital signs in HD: continuous telemetry, continuous O2 saturations, BP Q4 hours	
	Strict input and output monitoring and recording • Chest tube output Q8 hours • Urine output Q8 hours	
	Call MD if: • HR <60 or > 100 bpm • SBP <90 • MAP <65 • SpO2 <88% or O2 requirements >5L • Temp <35*C or >38*C • UO <0.5 ml/kg/min • Chest tube output >200 ml/hour	
	Ambulate the patient three times a day	
	Sit in chair when awake	
	Incentive spirometry 10 times Q1 hour	
	Remove mechanical thromboprophylaxis if ambulatory	
Medications	• Perform reconciliation for every patient. Hold unnecessary medications.	
	Paracetamol 1g PO QID regular	
	Tramadol 50mg PO TID regular.	
	Omeprazole 40mg PO BID	
	Ondansetron 4mg PO PRN max TID. If required, increase dose to 8mg.	
	Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 units SC BID.	
IV fluids	Saline lock	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient regarding enteral nutrition through the feeding jejunostomy (starting on POD 2)	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	

Postoperative pathway – Esophagectomy
POD 6

Date:

		Check
Nutrition	Full fluid diet.	
Tubes	Confirm with dietician if patient needs enteral feeds at home. If not, discontinue feeds. Otherwise, start patient teaching and prepare for discharge home on enteral feeds. • If not used, flush feeding jejunostomy tube with 20ml of water every day. Patient to continue this at home.	
	Jackson-Pratt to bulb suction: MD to "milk" drain	
	Chest tube to underwater seal (no suction). If patient was on enteral feeds and no signs of chylothorax, remove chest tube (no post removal CXR) – unless specified otherwise by MD.	
Labs	CBC, U+E, Mg	
Imaging	CXR portable (before chest tube removal)	
Nursing	Transfer to regular bed once cleared by MD	
	Ambulate the patient three times a day	
	Sit in chair when awake	
	Incentive spirometry 10 times Q1 hour	
	Remove mechanical thromboprophylaxis if ambulatory	
Medications	Restart home medications	
	Paracetamol 1g PO QID regular	
	Tramadol 50mg PO QID regular	
	Omeprazole 40mg PO BID	
	Ondansetron 4mg PO PRN max TID. If required, increase dose to 8mg.	
	Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 units SC BID.	
IV fluids	Stop IV fluids	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient for discharge without jejunostomy feeds. If the patient needs enteral feeds at home, please provide necessary counselling and home preparations. Counsel patient with regards to full fluid diet for 2 weeks followed by soft diet.	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	
Discharge	Prepare for discharge the next day	

Postoperative pathway – Esophagectomy
POD 7

Date:

		Check
Nutrition	Full fluid diet	
Tubes	Confirm with dietician if patient needs enteral feeds at home. If not, discontinue feeds. Otherwise, start patient teaching and prepare for discharge home on enteral feeds. • If not used, flush feeding jejunostomy tube with 20ml of water every day. Patient to continue this at home.	
	Remove drain – after MD's assessment and order	
	Remove chest tube (if not done) – after MD's assessment and order	
Labs	CBC, U+E, Mg	
Imaging	CXR portable (before chest tube removal)	
Nursing	Routine vital signs	
	Ambulate the patient three times a day	
	Sit in chair when awake	
	Incentive spirometry 10 times Q1 hour	
Medications	Restart home medications	
	Paracetamol 1g PO QID regular	
	Tramadol 50mg PO TID regular	
	Omeprazole 40mg PO BID	
	Ondansetron 4mg PO PRN max TID. If required, increase dose to 8mg.	
	Clexane 4000 units SC daily. If renal insufficiency: heparin 5000 untis SC BID.	
IV fluids	Stop IV fluids	
Referrals	Physiotherapy: please ambulate the patient and initiate chest physiotherapy	
	Nutrition: please assess patient for discharge without jejunostomy feeds. If the patient needs enteral feeds at home, please provide necessary counselling and home preparations. Counsel patient with regards to full fluid diet for 2 weeks followed by soft diet.	
Glucose	For diabetic patients, check glucose 4 times a day and follow insulin sliding scale	
Discharge	Discharge home today. See discharge instructions.	

Discharge instructions:

- To continue on full fluid diet for 2 weeks followed by soft diet
- If planned for enteral feeds at home, make sure patient education and home supplies are completed.
- Flush feeding jejunostomy tube with 20ml of water at home once a day.
- Paracetamol and tramadol (60 tablets): to take them regularly for 24-48 hours then PRN.
- To continue omeprazole 40 mg PO BID x1 month then 40mg PO OD.
- Multivitamin supplementation if total gastrectomy performed
- Follow-up in-person at the Thoracic Surgery Clinic in 2 weeks
- Arrange for follow-up at local health center with regards to suture removal (if required) and feeding jejunostomy care
- No heavy weightlifting for 8 weeks
- No driving while on pain medications and/or pain not under control
- Provide instructions for wound care

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