

TEXTBOOK OF SURGERY

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TEXTBOOK OF SURGERY

Current Surgical Diagnosis and Treatment

Jiří Hoch

MD, PhD

Professor of Surgery

Head, Department of Surgery, 2nd Faculty of Medicine

Charles University, Prague

Jan Leffler

MD, PhD

Associate Professor of Surgery

Department of Surgery, 2nd Faculty of Medicine

Charles University, Prague

Authors

■ **Prof. Jiří Hoch, MD, PhD**

Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague

■ **Assoc. Prof. Jan Leffler, MD, PhD**

Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague

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Jiří Hoch, Jan Leffler et al.

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info@maxdorf.cz, www.maxdorf.cz.

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Co-Authors

- **Petr Bavor, MD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Prof. Karel Cvachovec, MD, PhD, MBA**
Dept. of Anaesthesiology and Resuscitation, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Prof. Petr Goetz, MD, PhD**
Institute of Biology and Medical Genetics, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Ivana Hochová, MD**
Dept. of Clinical Hematology, University Hospital Motol, Prague
- **Zbyněk Jech, MD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Prof. Roman Kodet, MD, PhD**
Institute of Pathology and Molecular Medicine, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Tomáš Krejčí, MD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Jiří Lisý, MD, PhD**
Dept. of Imaging Methods, 2nd Faculty of Medicine, Charles University, Prague
- **Jan Neumann, MD, PhD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Otakar Nyč, MD, PhD**
Institute of Medical Microbiology, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Filip Pazdírek, MD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Ronald Pospíšil, MD**
Dept. of Surgery, Regional Hospital, Kladno
- **Assoc. Prof. Jana Prausová, MD, PhD, MBA**
Radiotherapeutic-Oncological Dept., University Hospital Motol, Prague
- **Assoc. Prof. Miloslav Roček, MD, PhD, FCIRSE, EBIR**
Dept. of Imaging Methods, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Jan Schwarz, MD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Jiří Svoboda, MD**
Dept. of Surgery, Regional Hospital, Příbram
- **Assoc. Prof. Marek Šetina, MD, PhD**
Complex Cardiovascular Center, General University Hospital, Prague
- **Assoc. Prof. Jaromír Šimša, MD, PhD**
Dept. of Surgery, 1st Faculty of Medicine and Thomayer Hospital, Charles University, Prague
- **Jaroslav Špatenka, MD, PhD**
Center of Transplantation, University Hospital Motol, Prague
- **Assoc. Prof. Michal Tichý, MD, PhD**
Dept. of Neurosurgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague
- **Martin Wald, MD, PhD**
Dept. of Surgery, 2nd Faculty of Medicine, University Hospital Motol, Charles University, Prague

PREFACE

The idea for this book grew from two earlier efforts (2001, 2003) published in Czech language. In these two editions we tried to develop a treatment of the art of surgery based on understanding the structure and functions of human body and its defects.

During the past ten years, since the last publication of *Special Surgery*, we got convinced that our effort to present this textbook as an attempt to provide a comprehensive integrated study of human surgery corresponds to the requirements of both undergraduate and postgraduate students is correct. The second edition quickly disappeared from booksellers' shelves and found its readers not only at the 2nd Medical Faculty of Charles University, but, to the delight of its authors and publisher, also among the wide range of medical professionals.

Surgery is a large subject. We have tried to make it more digestible by organizing the text into clearly demarcated sections, using statement headings to define what the reader can find in each section, and identifying important new terms by bold typeface.

This third revised and extended edition has a completely new form. Besides translating the book into English for the benefit of English speaking students, the texts have been updated, illustrations have been re-designed and new chapters have been added. A significant change is the addition of the chapters Cardiovascular Surgery, and Neurosurgery. Newly included in this edition of surgery textbook are brief chapters on anesthesiology, oncology, hematology, microbiology, pathology, genetics, and imaging methods, i.e. the fields related to surgery, without which current surgery might not exist. The themes and extent of these chapters generally correspond to the advancement of respective specializations in the field of surgery.

A new section of the textbook is the picture appendix. We expect that, similarly to the drawings, it will help students to remember at least some surgical findings and will remind them of practices and devices mentioned in the book.

The texts have been prepared in cooperation with a number of professionals from the Clinic of Surgery and other clinics, departments and institutes of the 2nd Medical Faculty of Charles University in Prague-Motol. Despite the fact that the diction of individual authors and their focus on details are different, all of them tried hard to prepare readable, comprehensible and concise texts. Currently, the pace of research in the field of surgery (e.g. transplantations) is extremely

rapid, and new information and insights are pouring out of the surgical rooms and laboratories at an almost unimaginable rate. To cope with this flood, students need two tools: a good framework of principles, established by this book, and the ability to use modern informatics.

We owe thanks to Ms. Jana Valterová for her diligent and thorough assistance during the preparation of the textbook. We are indeed grateful for the proof reading of the texts provided by Jan Lány.

Revolutionary times are nothing if not exciting. We have tried to convey the feel of fast-moving research, while providing a description in some depth of the techniques and data that are helping us to understand the evolution, nature and function of human body. This book will have succeeded if readers finish it sharing our excitement and enthusiasm for the continuing voyage of discovery. The journey is far from finished.

We hope that this textbook will be a good aid during the surgery studies, and the basis of surgical knowledge in the medical practice of the students and all other readers.

Jiří Hoch and Jan Leffler

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ABBREVIATIONS

AA	acute abdomen
ABCDE rule	Asymmetry, Border, Color, Diameter, Enlarging
ACB	aortocoronary bypass
ACD	right coronary artery
ACS	left coronary artery; acute coronary syndrome
AF	atrial fibrillation
ANC	absolute neutrophil count
AP	acute pancreatitis
APC	argon-plasma coagulation
APE	appendectomy
AR	radial artery
ARDS	acute respiratory distress syndrome
ARU	Anesthesiology and Resuscitation Unit
ASA	American Society of Anesthesiologists
AV	atrioventricular
AVM	arteriovenous malformation
BMI	body mass index
BP	blood pressure
CAD	coronary artery disease
CFA	common femoral artery
CKTCH	Centrum kardiovaskulární a transplantační chirurgie
CNS	central nervous system
COMECON	Council for Mutual Economic Assistance
CPAP	continuous positive airway pressure
CRC	colorectal cancer
CRP	C-reactive protein
CT	computed tomography
CTS	carpal tunnel syndrome
CVA	cerebrovascular accident
CVP	central venous pressure
ČTS	Česká transplantační společnost
DCC	deleted in colorectal carcinoma
DGHAL	Doppler-guided hemorrhoidal artery ligation
DIC	disseminated intravascular coagulopathy
DNET	dysembryoplastic neuroepithelial tumor
DSA	digital subtraction angiography
EC	extracorporeal circulation
ECG	electrocardiography
EEA	entero-enteroanastomosis
EF	ejection fraction
EGFR and VEGF	growth factor receptors
ECHO	echocardiography
EMG	electromyography
EO	endocrine orbitopathy
EPT	endoscopic papillotomy
ERCP	endoscopic retrograde cholangiopancreatography
ES	esophageal sphincter

EUS.....	endosonography
FAP.....	familial adenomatous polyposis
FBSS.....	back surgery syndrome
FMTC.....	familial MTC
FNAB.....	fine needle aspiration biopsy
FNH.....	focal nodular hyperplasia
FOBT.....	fecal occult blood
FT3.....	triiodothyronine
FT4.....	thyroxine
FW.....	Fahraeus-Westergren (test)
GCS.....	Glasgow coma scale
GEA.....	gastroenteroanastomoses
GER.....	gastroesophageal reflux
GERD.....	gastroesophageal reflux disease
GIST.....	gastrointestinal stromal tumors
GIT.....	gastrointestinal tract
GM.....	glioblastoma multiforme
GSV.....	great saphenous vein
HBD.....	heart-beating donors
HCC.....	hepatocellular carcinoma
HNPCC.....	hereditary nonpolyposis colorectal cancer
HR.....	heart rate
ICU.....	Intensive Care Unit
IE.....	infectious endocarditis
ICH.....	intracerebral hematoma
IKEM.....	Institute of Clinical and Experimental Medicine (Prague)
IMA.....	internal mammary artery
IPAA.....	ileal-pouch anal anastomosis
IPC.....	idiopathic proctocolitis
ITA.....	internal thoracic artery
KST.....	Coordinating Transplant Centre (Koordinační středisko tansplantaci)
LA.....	left atrium
LMWH.....	low-molecular-weight heparin
LT.....	total lobectomy
MALT.....	mucosa associated lymphoid tissue
MAP.....	MYH associated polyposis
MAP.....	mean arterial pressure
MEN.....	multiple endocrine neoplasia
MI.....	myocardial infarction
MIBI.....	methoxyisobutylisonitrile
MIDCAB.....	minimally invasive direct coronary artery bypass
MIU.....	international units
MODS.....	multiple organ dysfunction syndrome
MOF.....	multiple organ failure
MOH.....	multi organ (multiple organ) harvesting
MRCP.....	magnetic resonance cholangiopancreatography
MRI.....	magnetic resonance imaging
MRM.....	magnetic resonance mammography
MRSA.....	methicillin resistant Staphylococcus aureus
MTC.....	medullary thyroid carcinoma
NG.....	nasogastric
NHBD.....	non-heart-beating donors

NMM	nodular melanoma
NMR	nuclear magnetic resonance
NOTES	natural orifice transluminal endoscopic surgery
NRL	laryngeal recurrent nerve
NSAID	non-steroid antiinflammatories
OCHG	optochiasmatic-hypothalamic gliomas
OPSI	overwhelming post splenectomy infection
PCA	patient controlled analgesia
PEEP	positive end expiratory pressure
PEG	percutaneous endoscopic gastrostomy
PET	positron emission tomography
PMPS	postmastectomy pain syndrome
PNO	pneumothorax
PTA	percutaneous transluminal angioplasty
PTC	percutaneous transhepatic cholangiography
PTD	percutaneous transhepatic drainage
RC	ramus circumflexus
RES	reticuloendothelial system
RET	rearranged during transfection
RFA	radiofrequency ablation
RIA	ramus interventricularis anterior
RIND	reversible ischemic neurological deficit
SAH	subarachnoid hemorrhage
SILS	single incision laparoscopic surgery
SIRS	surrounding fatty tissue, inducing generalized inflammatory response
SLN	sentinel lymph node
SND	sentinel lymph node dissection
SPECT	single photon emission computed tomography
SSI	surgical site infection
SSM	superficial spreading melanoma
STE	subtotal resection of the thyroid gland
TAPP	transabdominal preperitoneal plasty
TBC	tuberculosis
TEM	total mesorectal excision
TEP	total extraperitoneal plasty
TgAK	antibodies against thyroglobulin
TIA	transitory ischemic attack
TIPS	transjugular intrahepatic portosystemic shunt
TIPSS	transjugular Intrahepatic portosystemic stent shunt
TNF	tumor necrosis factor
TOS	thoracic outlet syndrome
TRAK	antibodies against a TSH-receptor
TRAM	transverse rectus abdominus myocutaneous
TSH	thyroidea stimulating hormone
TTE	total thyroidectomy
US	ultrasound
USS	ulnar sulcus syndrome
VAC	vacuum assisted closure
VAS	visual analog scale
VATS	video-assisted thoracoscopy
VTE	venous thromboembolism
WL	waiting lists

1 NECK SURGERY

- 1.1 *Neck Cysts, Lymph Nodes*
- 1.2 *Inflammations, Tumors*
- 1.3 *Thyroid Gland*
- 1.4 *Parathyroid Glands*
- 1.5 *Compressive Neck Syndromes*

1.1 Neck Cysts, Lymph Nodes

In terms of neck organ diseases, surgical treatment in this region pertains to neck cysts, thyroid diseases, inflammations and lymphadenopathies.

Medial neck cysts are formed from the thyroglossal duct, the embryonic route of the descending thyroid gland, whose base develops in the area of the foramen cecum of the tongue. The thyroglossal duct is commonly obliterated to form a fibrous band, or it persists less commonly as a cranial projection from the thyroid gland isthmus as the pyramidal lobe. When the cranial part fails to close, an inner fistula develops, i.e. an opening at the tongue root. Retention of its content leads to the formation of a cystic structure under the skin on the hyoid bone level. The cyst may perforate and appear outside due to secondary infection or trauma, thus leading to formation of a complete medial fistula. As for differential diagnostics, medial cysts may be represented by a dermoid cyst or, more rarely, an ectopic thyroid gland, which may be the single tissue of the thyroid gland. Unless the tumor exhibits clear cystic characteristics, scintigraphy focused on the thyroid gland should be performed before surgical treatment. Medial cysts are excised together with the medium part of the hyoid bone, while ligating the inner mouth. A relapse may occur upon incomplete removal.

Lateral neck cysts are formed from the persisting thymopharyngeal duct. They have two mouths: The inner mouth is found on the arch of the soft palate, and cysts run along the inner carotid artery, while the outer mouth is found in the sternoclavicular fossa, at the medial edge of the sternocleidomastoid muscle. More commonly, lateral fistulas are incomplete. Radical excision should be performed in lateral neck fistulas during the first year of life, before the cyst becomes infected.

Cystic hygroma colli are polycystic structures filled with thin liquid, formed from the rudiment of the embryonic lymph sac. They are usually located on the lateral side of the neck below the mandible. Cranially, they may reach from the floor of the mouth up to the tongue, and caudally up to the axilla. Hygroma symptoms depend on the size and localization. A hygroma becomes hazardous in cases where it spreads on the tongue and in the mediastinum, which is manifested by dyspnoea. The treatment is based on extirpation as soon as possible after birth.

Lymphadenopathy – a neck lymph node disorder – is affected by primary and secondary (metastases) tumors or manifestation of a system disease. It may be benign or malignant.

Lymphadenitis, as a response to acute inflammations in the surrounding areas, are the main benign cause of neck lymph node enlargement. The main malignant cause of neck lymphadenopathy consists in cancer metastases that stem from tumors of the pharynx, larynx, trachea, esophagus, bronchi, digestive tract (Virchow's node – in the supraclavicular region on the left) and the thyroid gland. Malignant involvement of neck lymph nodes usually occurs with a lymphoma – Hodgkin's lymphogranulomatosis.

Surgical removal of the node for histological assessment is essential in differential diagnostics of neck lymphadenopathies.

1.2 Inflammations, Tumors

Carbuncle (carbunculus nuchae) is a typical **inflammatory manifestation** in the neck area. Most often, it develops in diabetics through the fusion of several **furuncles**, reaching deep down to the solid fascia. It tends to be highly painful; the solid fibrous subcutis and fascia prevent the inflammation and edema from spreading in the area. It is treated by wide excision of the inflammatory tissue up to the fascia. The defect is left to heal **per secundam**. A less radical method consists in a wide cross incision, always in connection with antibiotic treatment.

Deep **phlegmones** occur rarely, and they may originate from oral cavity diseases, a penetrating injury of the pharynx, esophagus, trachea or an advanced purulent inflammation of neck lymph nodes. These inflammations put the patient at risk of a septic condition or involvement of important neck structures (blood vessels, trachea, etc.), particularly upon late diagnosis. The condition is treated surgically by opening the lesion, draining it and administering antibiotics.

As for benign tumors, fibromas and lipomas, felt as palpable resistances, predominate; often they are asymptomatic. Surgical extirpation is used to manage the condition. Histological assessment is always needed.

Primary malignant tumors affecting the area of the neck include particularly **thyroid and larynx cancers** and they are discussed in respective chapters. **Secondary tumors** affect the entire lymphatic system.

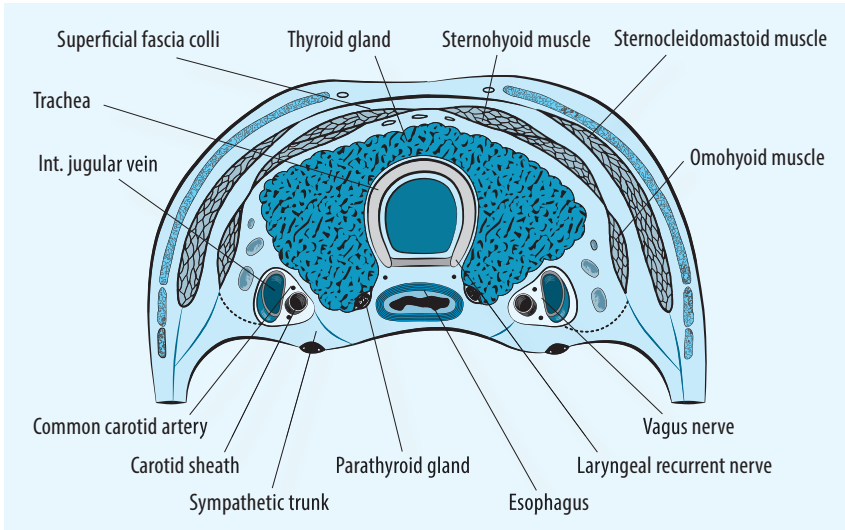


Fig. 1.1 *Cross-section of the neck at the height of the thyroid gland*

1.3 Thyroid Gland

The thyroid gland is butterfly-shaped and consists of two lobes connected with an isthmus of varied width. The thyroid gland is located ventrally and laterally from the trachea and the larynx. The isthmus is found on the level of the 2nd and 3rd annular cartilages. The non-constant pyramidal lobe runs cranially from the isthmus and is an embryonic residue of the thyroglossal duct. Nutrition for the thyroid gland is ensured by superior thyroid arteries (the first branch of the external carotid artery) and inferior thyroid arteries (originating in the thyrocervical trunk). Venous outflow is directed to the internal jugular vein. Lymph drainage reaches the pre- and paratracheal nodes first (the central group), then nodes along the internal jugular vein (lateral group) and the upper mediastinum. Parathyroid glands are found in the immediate vicinity of the thyroid gland, ventromedially, and recurrent nerves run dorsolaterally in the tracheoesophageal sulcus. Anatomical conditions and relationships are illustrated in Figs. 1.1, 1.2, and 1.3.

1.3.1 Symptoms

The symptoms of thyroid disorders are **local** – conditioned by anatomical changes of the gland, associated with pressure exerted on the surrounding structures (neck “enlargement”, a feeling of pressure, difficult swallowing, respiration disorders, pain, and voice disorders) – and **general**, caused by a functional disorder of the gland. Functional disorders of the thyroid gland are manifested as hypo-

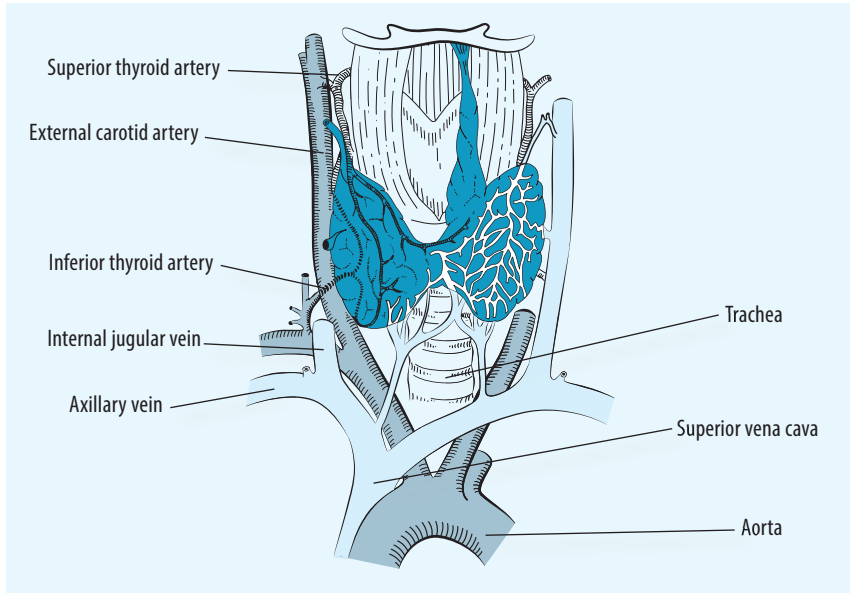


Fig. 1.2 Anatomical situation of the thyroid gland – vascular supply

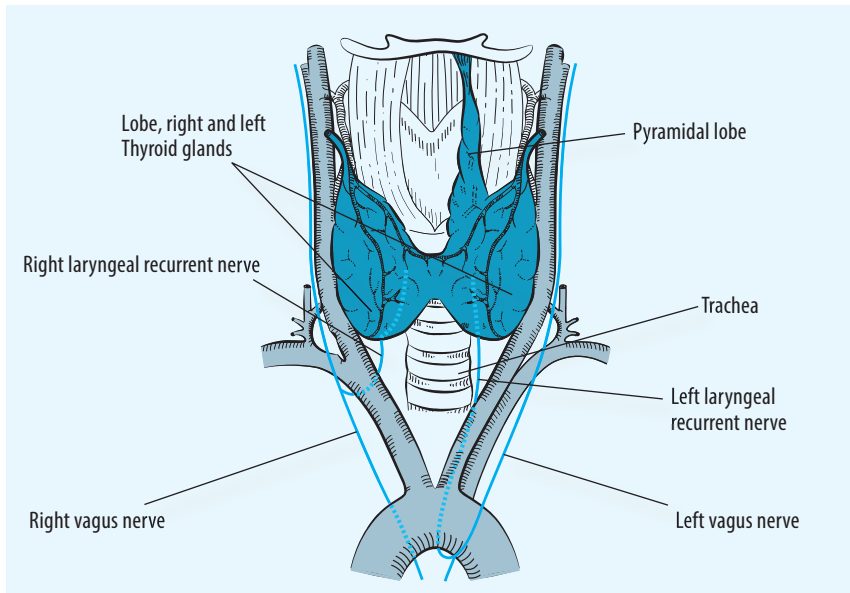


Fig. 1.3 Anatomical situation of the thyroid gland – course of recurrent nerve