PRINCIPLES OF METHODOLOGY IN CLINICAL ANATOMY

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Principles (or primitives) of the Anatomical Doctrine: what to describe

1. partition in morphological units (systems, organs)
2. body cavities vs appendix

Rules (or definitions) of the Anatomical Doctrine: how to Describe

anathomia est recta divisio (Schola Salernitana)

1. 3D shape of the organ
2. 3D size of the organ
3. 3D position of the organ in the body space (e.g. cavities), and its relationships of continuity and/or contiguity with other organs;
4. 2D projection of the organ on the body surface;

Functional simplifications:
1. direction of vascular flow (arteries vs veins and lymphatics)
2. sensory-motor output
3. articular and muscle movements
CLINICAL DIAGNOSTIC REASONING

“clinical problem” to explain

preliminary hypotheses (nosologic clinical knowledge)

collection of informations about the preliminary hypotheses (techniques of clinical information)

acceptance of some hypotheses (decision-making methods)

relevance of clinical informations to the accepted hypotheses ("accuracy " of the conclusions)

explanatory hypothesis (diagnostic explanation)

preliminary hypothesis

rule for confirmation

explanatory hypothesis

Gallbladder disease

pain to the right hypocondrion

gallstones

liver tumor

u.s. signs of gallstones

serological markers of liver function

high sensitivity u.s. signs of gallstones

low specificity of markers for liver tumor

high accuracy for gallbladder u.s.

low accuracy of markers for liver tumor

Gallbladder disease
preliminary hypotheses systematic and topographic (nosologic clinical knowledge)

“a priori” anatomical knowledge (conditio anatomica clinica)

collection of informations techniques of information in about the preliminary hypotheses clinical anatomy (techniques of clinical information)

surface anatomy, imaging anatomy, surgical anatomy

acceptance of some hypotheses refusal of other hypotheses (decision-making methods)

relevance of clinical informations to the accepted hypotheses (“accuracy “ of the conclusions)

explanatory hypothesis (diagnostic explanation)

anatomical component of the clinical problem

systematic and topographic “a priori” anatomical knowledge (conditio anatomica clinica)

techniques of information in clinical anatomy (surface anatomy, imaging anatomy, surgical anatomy)

application of the anatomical clinical method

the limit of normality in anatomy

probability of the “anatomical component” for a given conditio
## ANATOMICAL CLINICAL REASONING

### Problem to explain
- “anatomical component” of the pain to the right hypocondrion

### Preliminary hypotheses
- Gallstones
- Liver tumor
- Morphology, topography, morphometry
- Anatomical variants of gallbladder, liver, local ligaments, nerves, vessels

### Collection of informations
- U.S. signs of gallstones
- Serological markers of liver function
- Surface, imaging and endoscopic anatomy gallbladder, liver, local ligaments, nerves, vessels

### Acceptance or refusal hypotheses
- High sensitivity U.S. signs of gallstones
- Low specificity of markers for liver tumor
- High anatomical probability for nerve stimulation by gallbladder mobility
- Low anatomical probability for nerve stimulation by liver mobility

### Accuracy
- High accuracy for gallbladder U.S.
- Low accuracy of markers for liver tumor
- Low probability for others mobile organs in the gallbladder site
- High probability for other mobile organs in the right liver site

### Explanatory hypothesis
- Gallbladder disease
- Higher probability of gallbladder than liver involvement
The *anatomical component* of a clinical problem is represented by an *relation* (*statistically relevant*) between two elements, the *conditio anatomica clinica* and the *clinical event*.
The *conditio anatomica clinica* is an "*a priori* "knowledge of morphological data peculiar to the statistically relevant anatomical relation.

Simply, it is what we know as the "*mean anatomy*” of the context, in terms of principle and rules of the doctrine.
The **clinical event** is an objective manifestation proper to the clinical procedure, that establishes an “*a posteriori*” knowledge peculiar to the statistically relevant anatomical relation. It includes:

a) changes of 3D shape, size, position, relationships and surface projections of all viscera in the anatomical context of evaluation (i.e in the *conditio anatomica clinica*) with respect to “normal”

b) changes of blood flow direction (arteries, veins, lymphatics) of vessels in the anatomical context of evaluation with respect to “normal”

c) changes of sensory and/or motor output of nerves in the anatomical context of evaluation with respect to “normal”

d) changes of standard joint and muscle movements (flexion, extension, rotation, etc..) in the anatomical context of evaluation with respect to “normal”.
The clinical context (i.e. the viscera in the conditio anatomica clinica) having the highest probability to show the morphological changes produced by the clinical event (i.e. give rise to an anatomical relation statistically relevant between the conditio and the event) are the anatomical component of the clinical problem.
As a result, reasoning in clinical anatomy can be based on an hypothetico-deductive schema aimed at the confirmation (or falsification) of a preliminary hypothesis on the anatomical component of an individual clinical problem.
ANATOMICAL DOCTRINE (a priori knowledge)

CLINICAL DOCTRINE (clinical problem)

probabilistic reasoning

CLINICAL ANATOMY

- Principles and rules of the Anatomical Doctrine
- Inferences of the Clinical Doctrine

“a priori” knowledge of descriptive and classificatory data of normal human anatomy
clinical event

anatomical component of a clinical problem in a single subject

ANATOMICAL CLINICAL REASONING
CLINICAL ANATOMY is a doctrinal body concerning principles, rules and methods to interpret the morphological component present in the diagnostic reasoning. Therefore it can be assumed as METHODOLOGY.
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