Consultation interface between Pathologists and Forensic Science Experts for histopathology examination

V. Cirielli*, M. Brunelli†, F. Bortolotti†, Z. De Battisti‡, G. Del Balzo*, A. De Salvia*, A. Fafer*, F. Laposata*, C. Ghimenton†, D. Raniero*, E. Vermiglio*, M. Portas*, A. Scarpa*, F. Tagliaro*, S. Turáno* and D. De Leo†.

*Legal Medicine, Department of Diagnostics and Public Health, AOUI - Verona
†Legal Medicine, Department of Prevention, ULSS 8 Berica - Vicenza
‡Pathology, Department of Diagnostics and Public Health, AOUI - Verona

Background

Is Routine Histopathologic Examination Beneficial in All Medicolegal Autopsies?

D. Kimberly Molina, MD, Laisha L. Wood, MD, and Randall E. Trest, MD

<table>
<thead>
<tr>
<th>TABLE 2: Original Cause of Death</th>
<th>No. of Cases</th>
<th>% of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatic wounds</td>
<td>42</td>
<td>22</td>
</tr>
<tr>
<td>Stroke</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Cardiac</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>Drug intoxication</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Asphyxia</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Other causes</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Sub wounds</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Decomposing</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hypoenteric</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Seizure disorders</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other reasons</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>189</td>
<td>100</td>
</tr>
</tbody>
</table>

1/189 = <1%

(Am J Forensic Med Pathol 2007;28: 1-3)
Background

428 autopsy cases
8% cause of death determined by only histology

Key word 1998: discretion

The extent of histopathological of the autopsy tissue is a the discretion of the pathologist
The forensic pathologist shall perform histological examination in cases of no gross anatomic or toxicological cause of deaths.

1) sudden infant deaths
2) unexplained deaths
3) when necessary establish a tissue diagnosis

Debate remains to how much the magnitude of histopathologic examination may be of benefit to medicolegal purposes.
Objective & Aim

We sought to address the question after reviewing consultation cases requested to pathologists from forensics by an AUDIT in a real world setting.

Material & Methods

We reviewed Consultations performed in Anatomic-Pathology from a Hub single center (Verona) based on requests received from Legal Medicine Institutes (forensic pathologists).

January 2015 to August 2018

Audit - Database
Results: epidemiology

2015 yr: n. 124
2016 yr: n. 119
2017 yr: n. 134
2018 yr: n. 121 (august)

total: 499 forensic autopsies

54 consultations have been performed along three years

$\frac{54}{499} = 10.8\%$

Results

- Gross analysis was requested in 24/54 (44%)

- Histopathology was requested in 31/54 (57%) performed as follows:

1) on single organs primary on lung&heart in 17/54 (31%)
2) whereas multi-organ sampling was performed in 14/54 (26%)
Results

3/54  6%  infant sudden death (cardiac fibroelastosis, meconium aspiration syndrome)

9/54  17%  oncological typing (histotype, grading, staging)

42/54  78%  no gross cause of death or need of tissue diagnosis (rule out malignancy, other...)

Results: multiorgan samplings

- Lungs: 90% main organs
- Heart: 90%
- Liver: 90%
- Kidneys: 90%
- Brain: 90%
- Pancreas: 90%
- Adrenal glands: 90%
- Spleen: 90%
- Thyroid: 10%
- Parathyroid: 10%
- Vessels (Aortic): 10%
- Bladder: 10%
- Enteric system: 10%
- Genital tracts: 10%

Bone-marrow sampling was present in only 3/54 (5%)
Results

- Special stains was needed in 16% of cases (9/54)
- Immunohistochemistry was needed in 33% of cases (18/54)
- Molecular analysis was needed in 4% of cases (2/54)
- Standard methodology was needed in 15% of cases (8/54)

Gross re-sampling
special stains: Masson trichromic

H&E and need of additional stains

deposition of ialine membranes
special stains: Alcian-PAS

deposition of ialive membranes

Case no. 16

oncology

suspicious of mesotelioma

Case no. 22
immunohistochemical analysis

Case no. 22

calretinin

Molecular analysis

Patient A

Patient B

cancer

no cancer

exchange of bioptic material
cytogenetic FISH molecular analysis

X/Y

X/X

gross re-sampling

caroli disease versus colangiocarcinoma
doubled tissue block sampling

gross re-sampling

asbestos fibers research

30 µm thick sections
Asbestos fibers research

Perls stain

<table>
<thead>
<tr>
<th>ICH</th>
<th>Number of cases</th>
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</table>

Immunohistochemical processes

- commercially available antibodies
- standardization on formalin-fixed and paraffin embedded tissue
- automation
- robust processes
- interpretation

Annual quality assessment
### Conclusions

1. Standard methodology was changed in 15% of cases, primarily for gross re-sampling.
2. Immunohistochemical analysis was needed in 33% of cases to answer medico-legal questions.
3. Molecular analysis (cytogenetic FISH) was required in around 4% of cases.
4. Lack of systemic sampling of bone marrow (absence of information useful for forensics).

### Conclusion

10.8% of cases usually need an interface between forensic and anatomic pathologists.