

How much tissue is present in archival paraffin blocks and slides?

C. WOMACK and C. WADE

Department of Cellular Pathology, Peterborough District Hospital, Thorpe Road, Peterborough PE3 6DA, UK

Accepted: 9 September 2002

Introduction

The Retained Organs Commission (ROC)¹ was established as a special health authority by the Secretary of State in his statement to Parliament on 31 January 2001. In order to respond to enquiries and requests from relatives, mechanisms were set up to return retained unprocessed organs and tissues. These arrangements also applied to samples held in museums located mainly in pathology departments of larger district and university hospitals. In response to specific enquiries, the ROC decided that archival paraffin blocks and histological slides should also be subject to the same mechanism for return.

Here, a study is undertaken to investigate the quantity of tissue in relation to non-tissue elements (i.e. plastic, paraffin, glass) held in the surgical archive in the cellular pathology department of a district general hospital.

Materials and method

Consecutive surgical specimens examined macroscopically by one consultant histopathologist (CW) were weighed until measurements from 100 tissue blocks had been recorded. Formalin-fixed specimens requiring more than one cassette were dried with paper then weighed and dissected according to departmental standard operating procedure.

Dried content of each of the 100 tissue cassettes was weighed prior to routine processing and paraffin embedding. Following authorisation of the final surgical histopathology report, the archive was weighed. The weight of each paraffin block was recorded alongside the combined weight of the glass slides (stained and unstained) from each block. All measurements were done using the same electronic scales.

Original requests were then divided in to two groups: A) all tissue processed, and B) residual formalin-fixed tissue available. Surgical tissue in group B was assumed to be more comparable to post-mortem (PM) tissue blocks, in terms of weight and subsequent slides produced, than that in group

Correspondence to Dr C Womack
Email chris.womack@pnh-tr.nhs.uk

ABSTRACT

In order to inform the debate about tissue blocks and slides introduced by the Retained Organs Commission, a study is undertaken to determine the percentage weight of tissue present in the surgical archive in the cellular pathology department of a district general hospital. When original, unprocessed tissue weight is expressed as a percentage, based on the weight of 100 archival paraffin blocks, values range from 0.2% to 41.5%. When the corresponding archival slides are also included, the values fall as low as 0.1% (i.e. up to 99.9% of the stored archival material for a piece of processed tissue could be non-human material). The results are used to make a case for including archival histological material as part of the patient's clinical record, although it is accepted that this study was performed only on surgical tissue.

KEY WORDS: Human tissue. Tissue archive. Retained Organs Commission.

A, which contained a high proportion of small biopsies.

Results

Table 1 shows the calculated average percentage weight (with ranges) of tissue in the 100 blocks and associated slides retained in the laboratory archive, for groups A and B, together with the totals.

Discussion

Although the ROC is concerned primarily with organs and tissues taken at post-mortem, this small-scale study on surgical tissue aimed to inform discussion about blocks and slides introduced recently in an ROC consultation document.² On page 6 of the document it is suggested that 20-40% of material in archival paraffin blocks is tissue.

For paraffin blocks in group B, taken to be more representative of PM-type blocks, the present study confirmed the upper end of the ROC quoted range. The average percentage weight of tissue was outside the lower end of the ROC range at 18.9% and values for individual blocks were as low as 4.5%. For tissue samples processed in their entirety (group A) the percentage fell to just under 10% (i.e. approximately 90% of the archive block was plastic cassette and paraffin wax). When the whole archive was considered (by adding the contribution of the glass slides) the tissue percentage was reduced further, with individual values as low as 0.1% (i.e. up to 99.9% of the archive was

Table 1.

	Tissue in block average % (range) (unprocessed tissue weight ÷ block weight, x 100)	Tissue in archive average % (range) (unprocessed tissue weight ÷ block + slides weight, x 100)
Group A (all tissue processed)	9.9 (0.2-41.5)	5.5 (0.1-23.2)
Group B (residual fixed tissue)	18.9 (4.5-35.8)	10.6 (2.6-19.5)
Totals (groups A and B)	14.4 (0.2-41.5)	8.0 (0.1-23.2)

non-tissue laboratory materials).

The main issue here is whether or not processed human tissue in the archive of a pathology department is part of the patient's medical record. As a very high proportion of the archive in Peterborough District Hospital is plastic, wax and glass purchased by the trust, it should be regarded as integral to the patient record. Physical property apart, the archive could not exist without the skill of biomedical scientist staff, nor the equipment, estate and other supporting infrastructure provided by the hospital trust.

Although tissue in the archive is considerably modified by routine processing, the DNA content represents a further potential problem. However, under the *Data Protection Act 1998*, DNA is not considered to be data until sequenced.³ Therefore, it could follow that the presence of DNA in the archive is irrelevant to arguments/discussions about ownership.

Legal ownership of human tissue samples is a complex issue⁴ that may be addressed in future legislation.² It is becoming clear, however, that consent issues relating to organs and tissue taken at PM are different to those of surgical material removed for diagnostic and therapeutic purposes from living patients.⁵

We believe there is a good case for regarding archival tissue as part of the clinical record. However, all patients have access to their records (*Data Protection Act 1998*), and some clinical records (e.g. X-rays in the private sector, and maternity records) are held by the patient, but questions about who should hold archive histological material and should patients be given the opportunity to do so have yet to be posed. □

References

- 1 Retained Organs Commission
<<http://www.nhs.uk/retainedorgans/index.htm>>
- 2 Retained Organs Commission. Consultation document on unclaimed and unidentifiable organs and tissues. A possible regulatory framework.
<<http://www.nhs.uk/retainedorgans/consultationfeb02.pdf>>
- 3 Furness PN. Research using human tissues – a crisis of supply? *J Pathol* 2001; **195**: 277-84.
- 4 Womack C, Gray NM. Human research tissue banks in the UK National Health Service: law, ethics, controls and constraints. *Br J Biomed Sci* 2000; **55**: 250-3.
- 5 Womack C. Ethical issues relating to supply of human tissue to the commercial biomedical sector. *Cell and Tissue Banking* 2002. In press.